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Plum Culture

and

District Lists of Plums Suitable for Canada

with

Descriptions of Varieties

BY W. T. MACOUN
DOMINION HORTICULTURIST



DIVISION OF HORTICULTURE
DOMINION EXPERIMENTAL FARMS

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PLUM CULTURE

BY

W. T. MACOUN

Dominion Horticulturist

If every member of every family in Canada had a plentiful supply of plums of the best quality for home use, and if enough of the fruit were exported profitably from Canada to supply the demands of the people of other lands there would be less necessity for publishing a bulletin on Plum Culture; but unfortunately this is far from being the case. Comparatively few people get good plums to eat, especially in the fresh condition, and the export trade in plums, whatever it may be in the future is practically nothing at the present time.

Past experience has been that the consumption of fruit increases almost, or quite, as rapidly as the supply, providing the latter is properly distributed, and it is not too much to expect that it will do so in the future, at least for some time. The desire for fruit grows on the consumer, and the better the quality of the fruit supplied the greater will be the desire for it.

The plum has not been as profitable to grow in Canada as some other fruits, but with a careful selection of varieties and good care it will be found to give fairly good returns. In those parts of Canada where the European plums do not succeed, the improved native and American varieties have been found very profitable. Some of these ripen before the European plums come on the market and they sell at high prices.

In preparing this bulletin, it has been necessary to correspond with many fruit growers in Canada to obtain accurate information in regard to plum culture in different parts of the Dominion. This, with the knowledge gained from experience at the Central Experimental Farm, has enabled the writer to make this bulletin much more useful than it otherwise would be.

CLASSIFICATION OF PLUMS

There are five species of plums from which are derived most of the cultivated varieties of to-day, namely, the European, derived from *Prunus domestica*, *Prunus insititia*, and *Prunus cerasifera*; the Japanese, from *Prunus triflora*; and the American, from *Prunus americana*, *Prunus nigra*, and *Prunus hortulana*. A Chinese species, *Prunus Simonii*, has given at least one variety and has been used extensively in cross-breeding, and the so-called Western Sand Cherry, *Prunus pumila Besseyi*, a native of North America, has also been used as a parent in plum breeding.

EUROPEAN PLUMS

This class of plum has reached a higher stage of development than either the Japanese or American, which is due to the fact that they have been under cultivation from very early times and that more systematic and intelligent labour has been spent on their improvement. It is thought by some authorities that the European plums have gradually developed from the Damson, and that the latter originated from the European sloe, *Prunus spinosa*. The Damsons,

however, are so distinct in tree and fruit from other European plums that other authorities make a separate group of them. There is such a wide difference between the Damson and the Reine Claude or Green Gage groups that it seems reasonable to suppose that the origin of the two was different, and indeed they have been regarded as different types, at least since Middle Ages. Both the Damsons and the Green Gages come fairly true from seed. The following classification is the same as that given in the "Plums of New York" (Hedrick) and "Plums and Plum Culture" (Waugh):

Yellow Egg type.—This includes some of the largest European plums and is represented by Yellow Egg, Golden Drop, and Grand Duke.

Perdrigon type.—The only variety of this type which is grown in Canada, to the writer's knowledge, is the French Red Perdrigon, introduced by the Trappist Fathers, Oka, Que.

Diamond type.—(Waugh), *Imperatrice type* (Hedrick).—This includes some of the most productive, firmest and best shipping varieties but usually those of only medium quality. Varieties of this type are Diamond, Kingston, Quackenboss, Glass, Shipper, Mount Royal, and Arctic. Archduke and Grand Duke, while differing considerably from the type, might be put here.

Bradshaw type.—Under this type, Professor Waugh includes Bradshaw, Victoria, Pond, Field, Duane Purple, Oswego and Giant Prune. These varieties, however, have not as many characteristics in common as those of the previous types. In the "Plums of New York" they are included in the next.

Lombard type.—Represented by Lombard, Communia, Voronesh 20 of Budd, Leipsic of Budd, Prince of Wales and Merunka. The Early Red Russian and White Nicholas of Budd would also be included in this type.

Prune Group.—Represented by Italian Prune (Fellenberg), German Prune, Raynes, Agen, and Ungarish.

Damson Group.—In this are the Damson type and Mirabelle type.

Damson type.—The best known varieties of this type are Shropshire, French, Frogmore and Cluster.

Mirabelle type.—The varieties grown in Canada are Mirabelle *précocce* and Mirabelle *tardive*.

Reine Claude or Green Gage Group.—There is a large number of fine dessert varieties in this group, the principal being Reine Claude, Green Gage, Lawrence, Imperial Gage, McLaughlin, Jefferson, Washington, General Hand, Bleeker, Peters' Gage and Queen May.

Plums of the European class succeed best in Ontario in the counties bordering on the great waterway southward and eastward from the Georgian Bay to the Thousand Islands. They may be grown very successfully all through southwestern Ontario and the Niagara peninsula, and through the central counties to those bordering on Lake Huron. East of Toronto the best varieties are grown within twenty-five or thirty miles of Lake Ontario. North and east of these areas, only the hardiest kinds succeed well, and but very few are hardy north of latitude 45°.

In the province of Quebec, a few varieties give fair satisfaction in the Eastern Townships and a few on the Island of Montreal, and along the Ottawa river above Montreal, past the Lake of the Two Mountains. Along the south shore of the St. Lawrence river, below the city of Quebec, in the counties of Levis, Bellechasse, Montmagny, L'Islet, Beauce, Kamouraska and Temiscouata, most of the finest varieties of European plums can be grown with good success, and along the north shore in the counties of Portneuf, Quebec (Island of Orleans, especially), and Charlevoix, some of the hardiest sorts succeed. It is, however, near the river, and where its influence is felt, that these plums succeed best.

On Prince Edward Island, the European plums do well; also in many parts of Nova Scotia, and they do particularly well in the southern part of that province. In New Brunswick, some of the varieties succeed in the warmer parts of the province, particularly along the Lower St. John river and near the south coast.

The European plums do exceptionally well on Vancouver Island and the Lower Mainland of British Columbia, and also in the Okanagan, Kootenay and other valleys, and no doubt in many of the northern valleys of that province with temperate climates, where they have not been fully tested yet, they will be found to succeed.

In the Prairie provinces, the European plums have not been found sufficiently hardy, the trees being winter-killed.

The hardiness of the European plums appears to be governed partly by the moisture of the atmosphere, and partly by the temperature. At Ottawa, very few varieties will fruit at all, and most of these bear a good crop only once in three or four years. It is not the wood which is killed by winter, although winter-killing of the tips does occur when the temperatures are very low, but the flower buds are destroyed. This killing of the buds appears to be due partly to the dry, cold weather of winter, and partly to spring frosts. Good crops of European plums have been produced at Ottawa after the temperature had been lower than 20° Fahr. below zero the previous winter, showing that temperature alone is not the cause of failure. Along the south shore of the St. Lawrence, below the city of Quebec, where the temperature falls 30 degrees Fahr. below zero, good crops of the best varieties of European plums are regularly produced. The moisture of the air in this case appears favourable to the preservation of the flower buds, even though the temperature is low. There is a great difference, however, in the hardiness of the different varieties, and in time seedlings may be produced which will have flower buds capable of surviving the coldest temperatures which occur in cold districts in any winter. Sudden changes of temperature are hard on flower buds, but near large bodies of water the temperature does not change suddenly.

JAPANESE PLUMS

Owing partly to their introduction being comparatively recent, partly to their vigour, productiveness and good shipping qualities, and partly to the way they have been boomed, the Japanese plums have been widely planted on this continent in recent years. Although introduced into America as recently as 1870, this class of plum is now almost as well known as the European. The origin of the Japanese plum is unknown, but it is thought to be a native of China. The Japanese were not very systematic in their nomenclature, and when the plums were introduced into America there was great confusion of names. They have, however, been fairly well worked out, and the best known and most profitable kinds can now be obtained true to name. Many seedlings have been grown in the United States and a large number of hybrids originated, some of which have great merit.

The fruit of most of the varieties is only medium in quality: a few, however, are good, and a still smaller number very good. The productiveness, firmness, appearance and good keeping qualities are what make these plums valuable. The majority of the Japanese plums are not as hardy in the flower bud as the European and some are much tenderer. They bloom very early, and on this account are more likely to be injured by spring frosts. The Burbank and Red June are, perhaps, the hardiest.

The Simon or Apricot plum, *Prunus Simonii*, Carr., though not a Japanese plum has some of its characteristics and may be classed with the Japanese plum here. This plum is thought to be a native of China and was introduced into

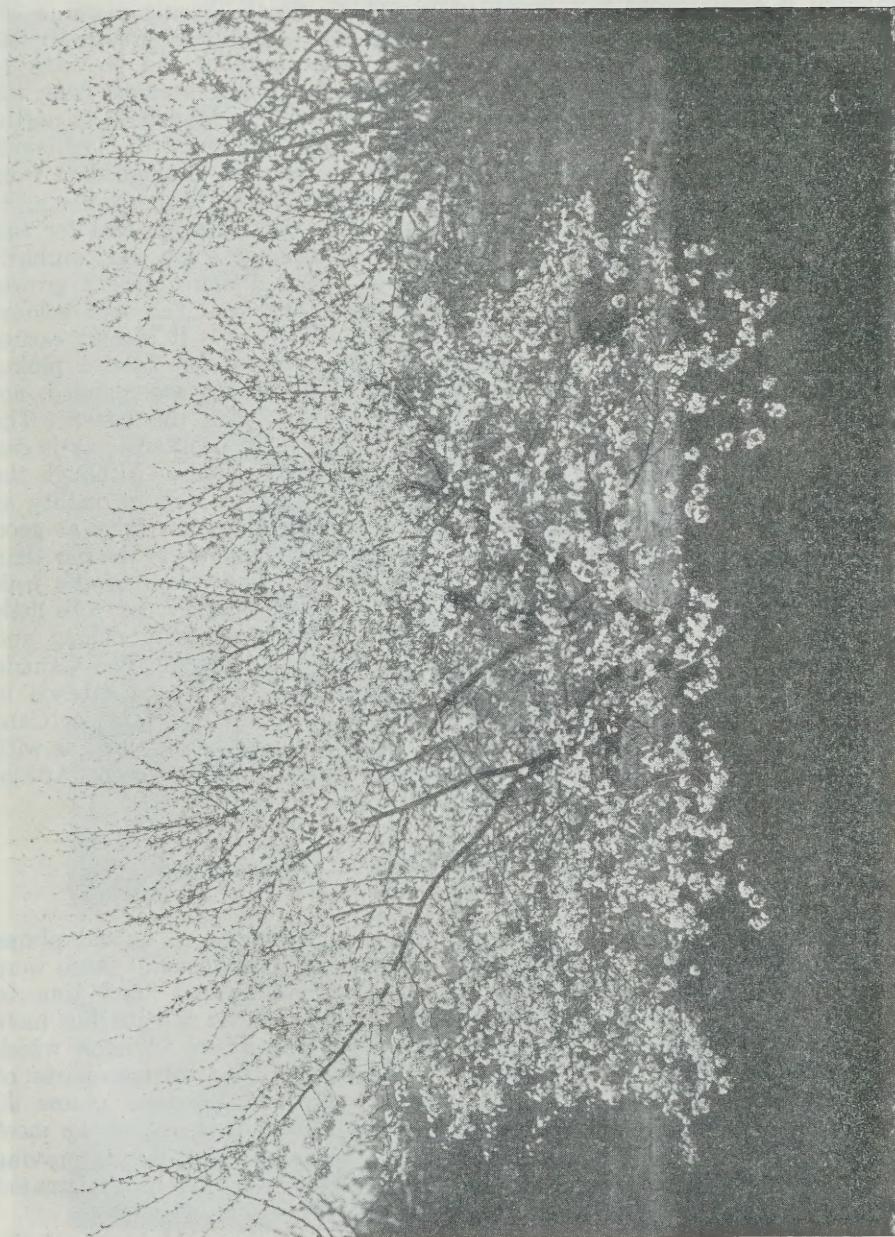
America from France about fifty years ago. It has not been planted to any extent in Canada, nor is it widely grown in the United States. The tree is productive and the fruit is large and handsome, though inferior in quality. The fruit keeps and ships well. It does not appear to be any hardier than the Japanese plums. It has been grown with success in southwestern Ontario, but is not a desirable plum to plant. It has been used as a parent in cross-breeding.

AMERICAN PLUMS

These plums have a wide range on the American continent, being found wild from Mexico north to the province of Manitoba, and from the Atlantic to the Pacific oceans. They are represented over this great area by seven distinct species and six recognized groups or types. Of these, the cultivated varieties originating from the American wild plum *Prunus americana*, Marsh, and the Canada plum, *P. nigra*, Ait., include nearly all the American plums that are profitably grown in Canada. The more southern groups, of which a few varieties are partially successful, are: the Miner group, *Prunus hortulana mineri*, Bailey, which, is closely related to *Prunus americana*, but has some resemblance to the Wildgoose group; and the Wildgoose group, *Prunus hortulana*, Bailey. It is, however, only in the mildest parts of Canada that they are even fairly satisfactory. At Ottawa, the flower buds are injured and the crop light. The varieties of the Wayland and Chicasaw groups of plums,—two other important groups—are too tender for most districts in eastern Canada.

Americana Group.—This group has, up to the present time, furnished the best varieties of American plums. The range of *Prunus americana* as given by Hedrick in the "Plums of New York" is as follows:—"The boundary line of its northern range passes through Central New York to Central Michigan, southern Wisconsin, Minnesota, and South Dakota, extending northwestward to Manitoba and reaching its western limits in Utah. It occurs locally southward through Colorado to northern New Mexico. It is rare in Oklahoma and does not occur in Texas, but is represented in Missouri by a pubescent form. East of the Mississippi the typical species occurs in all of the States from Central New York southward to northern Florida."

The tree, is a spreading grower, sometimes reaching a height of twenty feet. On account of its spreading habit the trunk and large branches are often split or broken by winds when laden with fruit or by heavy snow storms in winter, and this is a serious drawback to some varieties especially. The varieties of this species bloom later than the Canada plum, *P. nigra*, and sometimes escape frost from which the native species suffer, an example of which occurred in Ottawa in 1902 and 1913. The trees are very productive and the fruit is much improved in size by thinning. The fruit varies greatly in size and the colour ranges from yellow to red. The skin is generally tough, and often thick and astringent, but the flesh is moderately firm or firm, very juicy, sweet, and sometimes rich and high flavoured. The stone usually clings, but occasionally is almost or quite free. When growing wild, this tree is found thriving best in rich and rather moist soil, but under cultivation it succeeds very well even where the soil is comparatively poor and not very moist. It is only about seventy years since the Americana plums were thought worthy of cultivation, but during the past few years the cultivated and named varieties have increased so fast that there are now over two hundred of them. The size, appearance and quality are also very much improved. Indeed, the improvement is remarkable considering the short time in which it has been made, and we may hope for still greater improvement yet. The appearance of the plums is all that could be desired, and the best varieties are almost large enough, but there is great room for improvement in the character of the skin and flavour of the fruit, although the latter is good. Earlier varieties are also wanted. The present fruiting season of the Americana



Cottrell plum in bloom. Typical tree of *Prunus americana*.

plums at Ottawa is from the fourth week of August until about the last of September. Some varieties of this group are Bixby, Wolf, Hawkeye, Stoddard, Brackett and De Soto.

Nigra Group.—From this group of plums, of which *Prunus nigra* is the species, will probably be originated the varieties which will be of greatest value in the northern parts of Ontario, and the coldest parts of the province of Quebec. This is the wild plum of Eastern Canada, having a range from the Maritime Provinces westward to Manitoba. It is found in Michigan, in northern New York and in the New England States. It is also found in Newfoundland. Although in some places this species can scarcely be distinguished from *P. americana*, into which it seems to merge in some districts, in the colder parts of the provinces of Ontario and Quebec the tree is very distinct, and for this reason we prefer considering it a separate species although some good authorities make it merely a variety of *P. americana*. It is a more upright grower than *P. americana* and the wood is darker and tougher. The tree seldom breaks down like *P. americana*, which is a great advantage. It blooms earlier and has larger flowers than the *Americana*. The flowers also have a pinker tinge, especially when opening. The serrations of the leaves are rounded, not acute as with *Americana* and the leaves are broader than the latter. The fruit ripens early, and on this account is sometimes more profitable, as it can be marketed when there is little competition with other plums. Although the named varieties which are now upon the market are not as high in quality as the best of the *Americana* group, some of the wild seedlings are fully as good in quality, though not as large. The skin of the Canada plum is thinner than the other species and breaks up easier when cooked. The colour of the fruit varies almost as much as *P. americana*, but is more often entirely red with little or no bloom. The shape varies, but the fruit is more regularly oblong and oval than *P. americana* and is not flattened like that species. The Canada plums begin to ripen about August 1 at Ottawa, and the season extends to September. Very little has yet been done either in the United States or Canada to improve *P. nigra*, but as good results are as likely to be obtained as with *P. americana*. Some of the varieties of this group are Carstesen, Aitkin, Odegard, Cheney, Assiniboine, and Mammoth.

HYBRID PLUMS

During the past twenty or twenty-five years a number of hybrid plums have been placed upon the market. Most of the more prominent of these were originated by Luther Burbank, of California, who has devoted much time to this work. Few of his hybrids, however, which are now on the market have proved valuable in Canada. The parents of most of them are varieties which do not prove successful where the climate is severe. The warmer parts of Ontario, Nova Scotia and British Columbia, where the Japanese plums do well, are where they are most likely to succeed. Maynard is one of the most useful. The Omaha, a hybrid originated by Williams of Nebraska, is proving very valuable at Ottawa on account of its earliness. Hansen has originated some hybrid plums which are proving hardy in the colder districts.

There is a wide field for work in plum hybridization. If blood of the European and Japanese varieties can be introduced into the *Americana*s and *Nigra*s and the hardiness of the latter maintained, plum culture in the north will receive a great impetus. It is not too much to hope that this will soon be accomplished, and, in the case of the Japanese and *Americana*, the Omaha is an example of a combination of these two.

PLUM CULTURE IN THE DIFFERENT PROVINCES OF CANADA

A circular was sent out to leading fruit growers in the different provinces of Canada, in which certain questions were asked relating to plum culture in each province. From the replies, the following summaries have been made, which it is thought may prove useful.



Cheney plum—(*Prunus nigra*)

Prince Edward Island.—The European plums succeed well in this province. The Japanese varieties are too tender, and natives are not desired. The quantity of plums grown on the Island is limited as the home market is not large.

Plums have been shipped with good success to the mining towns in Cape Breton and Nova Scotia. Late spring frosts sometimes affect the crop. The trees, as a rule, bear heavily every other year, but are not long-lived. Black Knot is the most troublesome disease, and Shot-hole fungus also causes injury. Plum culture is considered profitable.

Nova Scotia.—The climate of the Annapolis and adjacent valleys and parts of the south coast is admirably suited for the culture of the European plum, and some of the Japanese varieties do well also. Large quantities of plums could be grown, but, owing to the small size of most of the towns, the market is limited at present. Cold, wet weather in spring, especially during blossoming time, and severe winters, affect the crop occasionally. Very early and very late varieties are profitable as they do not come so much into competition with Ontario fruit. Black Knot and Brown Rot are troublesome, but the latter is not so prevalent as in some other parts of Canada.

New Brunswick.—Except near the Lower St. John river and near the coast in Charlotte and some of the other counties, where a few of the hardier European plums do fairly well, the chief dependence must be on the Native and Americana varieties. Severe winters and late spring frosts are, occasionally, hard on the European plums. Black Knot is the most prevalent disease; and of insects, the Curculio. Local markets are good but they are mainly supplied with plums from other provinces.

Quebec.—With the exception of the south shore of the Lower St. Lawrence river where there is open water in winter as a result of which the European plums succeed admirably, it being possible to grow many more plums than is being done at present, the growing of plums is confined mainly to the Native and Americana varieties. Along the Ottawa Valley, in the vicinity of Montreal, and in the Eastern Townships, European plums give crops occasionally, but the winters are too severe to make them a commercial success except in the most protected places. In L'Islet and Kamouraska counties where most of the European and Domestica plums are grown, the growers are now canning their plums with good success. The season is very late, some varieties keeping into November. Good prices are obtained for native plums in local markets, but the larger cities and towns are supplied with European plums from western Ontario.

Black Knot is the commonest and most injurious disease. There is also some Brown Rot. Scab and Plum Pocket affect the native plums very badly and in some places they rarely mature because of these diseases, unless sprayed. Curculio is often injurious unless the trees are well sprayed.

Ontario.—The climate of a large part of western Ontario is suited to the culture of both European and Japanese plums and great quantities are grown in the Niagara district especially. Along Lake Huron further north, the European plums do well. Sometimes low temperatures in winter or spring frost, lessen the crop. In Eastern Ontario, only the hardest European plums need be tried and it is only in an occasional year that there is a full crop of these, even in protected places, the winters being too severe. The Native and Americana varieties do well in eastern and north central Ontario and early varieties bring good prices. In northern Ontario, the earliest native varieties should be tried.

In the plum districts the Brown Rot is the most serious disease, but some varieties are not much affected. Curculio is controlled by spraying.

Where the Native plums are relied upon, the Scab and Plum Pocket make the crop very uncertain unless the trees are thoroughly sprayed. Taking one year with another, there is a fair profit in plums in Ontario.

Prairie Provinces.—In the Prairie Provinces the winters are too severe for any but the Nigra and Americana varieties, the Native varieties and the hybrids between the plum and the Sand Cherry. Early varieties are the most desirable as the later Americanas do not ripen. Spring frosts often prevent the setting of fruit of even the Native sorts. Good prices are given for Native plums when they can be obtained.

British Columbia.—Large quantities of plums can be grown in British Columbia, as the climate is admirably suited to their culture in many parts. The varieties that ship well are the most profitable. The Italian Prune (Fellenberg) is the variety most largely grown. The Japanese varieties succeed in the warmer parts. In the dry districts, there is little injury from disease, but on the lower mainland Brown Rot often causes great loss. Spring frosts sometimes lessen the crop. In the moist districts, moss on trees is sometimes troublesome unless the trees are well sprayed when dormant.

EXPERIMENTS WITH PLUMS AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA

Experiments with plums were begun at the Central Experimental Farm in 1888 and have been continued ever since. The testing of varieties to determine their hardiness, productiveness, and other qualities has been one of the most important experiments, and a large number of varieties have been tested. Experiments have also been carried on with various stocks, to learn which was the most satisfactory for the various classes of plums, and different methods of grafting have also been tried. The spraying of the trees with various mixtures and solutions to control fungous diseases and insect pests has also been an important part of the work. Careful records have been kept of the dates of blooming of the different varieties, and the information thus obtained is very useful, as it has been proven that few varieties of American plums are self-fertile, and it is thus necessary to have, in most cases, some other kind blooming at the same time in order that fruit may set well. A table showing the blossoming period of the different varieties will be found in this bulletin. The yields from each individual plum tree are kept separate, and it is thus possible to tell whether one tree is bearing better than another. Much work has been done in testing and originating seedling plums, especially of the American varieties, and a few very promising sorts have been produced and introduced. More attention is now being paid to the Native species *Prunus nigra*. Experimental work in cross-breeding has also been carried on.

The soil in the plum orchard is not as suitable as it might be, being a light, sandy loam but good plums are raised. The trees were originally 20 by 20 feet apart, but interplanting has been carried on and the trees are now 20 by 10 feet apart and some 20 by 15 feet. There are now 320 trees in the orchard. In addition there is a large number of seedlings planted 10 by 10 feet apart.

Following are the number of varieties of each group or class in the orchard and nursery:—

Group or Class	Number of varieties
European.....	24
Americana.....	65
Nigra.....	8
Miner.....	2
Wayland-like.....	1
Hybrid.....	27
Total varieties.....	127

SEEDLING VARIETIES

While there are many fine named varieties of plums which succeed in the more favourable parts of the provinces of the Dominion, there is always the possibility of getting something better. In the colder parts of the provinces where few of the better plums succeed, there is a fine opportunity for developing hardier and better kinds. One of the easiest and best methods of obtaining new varieties is by growing seedlings from the stones of the best plums which have ripened in the district where new kinds are desired, and if no plums have yet been grown these stones should be procured from the nearest place where they can be obtained. The European plums have been improved for so many centuries that it will be difficult to obtain a seedling plum of this class which will be better in quality than the best now in cultivation. Varieties with hardier fruit buds are desired, and these may have to be obtained by crossing the hardiest European plums now known with closely related species from a cold climate. The native and Americana plums have been, relatively speaking, little improved as yet, and there is a wide field for development here. Stones should be saved from the largest plums from the most productive tree of the variety of which seedlings are desired. These stones should, when possible, be planted immediately after the fruit is ripe, as if the stones become dry they will not germinate as well, and sometimes will not grow at all. If they are planted at the time the fruit is ripe it is not necessary to remove the pulp. If the stones cannot be conveniently planted at this time they should not be allowed to become dry. They may be kept over winter in boxes mixed with sand, which should be moist but not wet. A layer of sand about one inch in thickness is put in the bottom of the box and is merely covered with a layer of stones, the latter are then lightly covered with sand and another layer of stones on top, and so on until the box is filled. This is called stratification. The box should be buried outside where there is good drainage and no danger from small animals, or kept in a cellar. If the stones freeze when they are thus moist in sand they will crack and seedlings grow quicker in the spring, but there is a danger of their drying out when exposed to the frost unless the box is buried. Stones spread outside in the autumn in a well-drained place and lightly covered with soil will often come through the winter in fine condition.

The stones should be planted not more than one inch deep (often they are planted too deep) in good loamy soil, in rows three feet apart and dropped from one to two inches apart in the rows. These usually germinate in the spring, but if the stones have become dry before planting few, if any, will germinate the first year but the next year, if they have not been too dry before planting they will germinate well, if not disturbed. The soil should be kept thoroughly cultivated during the summer to induce a thrifty growth. The next spring or the one following, the young trees should be planted out about ten feet apart and left to fruit, which they will do in from three to six years. Scions may then be taken from the promising varieties and grafted. Stones planted from the best of these will be likely to produce something still better. As many of the seedling plums, especially of the Americana and native varieties, are as good as their parents, the ground on which they are growing is not lost as the fruit can be sold to advantage.

CROSS-BREEDING

New varieties of plums may be obtained by cross-breeding, and by this method one is even more likely to obtain the kind of plum desired, but the time for this work is so limited, being only a few days when the flowers are opening, that only specialists can very well undertake it. The method of crossing is explained in Bulletin No. 86, "The Apple in Canada."

PROPAGATION.

The plum is propagated principally by budding and grafting, although a few varieties will strike more or less readily from cuttings, and some kinds when on their own roots are increased from suckers.

STOCKS

While it has not yet been clearly proven that the stock on which a scion is grafted will materially change the flavour or season of the fruit, it does affect the vigour and fruitfulness of the tree in a greater or less degree. If a scion is grafted on a dwarf stock the tree will be dwarfed and will come into bearing sooner than if grafted on a thrifty stock, as anything which checks the growth of the tree promotes early fruitfulness. It is possible, however, especially in top grafting, to have such a slow growing stock that the graft outgrows it too much, the tree becomes top heavy, and if it does not die owing to a poor circulation of sap, the graft is liable to be broken off by wind. The tree in the accompanying cut (a European plum top-grafted on *Prunus nigra*) was killed because there was not a free circulation of sap. The stock also, if it is tender, may be winter killed, and a tree which may be perfectly hardy above ground is ruined by being grafted on such a stock. Nurserymen find that the scion influences the root system of the stock, but it is not so clear that the scion or graft makes the scion any hardier.

If a tree is planted deep enough, roots may be thrown from the scion and the tree will eventually be on its own roots, but this should not be depended on as a rule, and a stock should be used that will be hardy, give a good union, and make a thrifty tree.

The two main stocks used in grafting and budding the plum are the Myrobalan and Marianna.

Myrobalan.—This is a European plum, *Prunus cerasifera*, and unites readily with the scion and desirable stock, where the winters



European (*Domestica*) top grafted on *Prunus nigra* three feet from the ground.

is imported principally from France. It throws few suckers, which makes it a very

are not very severe. It is used very generally in America, but more in the north than in the south where the Marianna is chiefly used. The Myrobalan plum is not a satisfactory stock for the colder parts of Ontario and Quebec, as it is liable to winter kill.

Marianna.—The Marianna plum is used largely in the southern States as stock, where it propagates freely from cuttings. It is thought to be a hybrid between the Myrobalan and the Chickasaw plums. This, also, is not a desirable stock for the colder parts of Ontario and Quebec.

Peach.—The peach unites readily with the plum and is used very largely in the United States as a stock for it. It can be grown cheaply, and strong young stocks are readily obtained for grafting and budding. It has, however, the disadvantage of not being hardy enough in many parts of Canada.

St. Julien.—The St. Julien is a European stock that is used to a limited extent in America for propagating the European plums, but the Myrobalan and Marianna stocks can be obtained so cheaply that it is not used much now. The St. Julien is, however, the safest stock for European plums in the north.

Americana and Native.—Americana and Native plum seedlings furnish the best stocks for the colder parts of Canada. The young trees make strong growth and are very suitable as stocks for grafting and budding. This stock is not usually satisfactory when the European plums are top-grafted on it, as the top outgrows the stock and either breaks off from being top heavy or dies from lack of nourishment, as the native varieties, especially, grow much more slowly. No bad results, however, have followed from root grafting the European plums on American stock, and good thrifty trees have been obtained.

Sand Cherry (Prunus pumila).—The Americana plums have been successfully root grafted on the Sand Cherry at the Experimental Farm, and trees which had been grafted nineteen years were still in good condition with a perfect union and bearing well when they had to be removed. The trees are considerably dwarfed by this stock. The Sand Cherry may prove very useful where close planting is adopted, as many more trees could be planted on an acre when dwarfed by this stock. Trees grafted on this stock, however, are not as firm in the ground as we should like, and strong winds have a tendency to loosen them.

BUDDING

The favourite method of propagating plums is by shield-budding, and the best season for doing the work is in late summer, some time during August being the best time in Ontario and Quebec. At Ottawa the trees have been found in good condition during the second week of August. In some parts of Canada the time will be earlier and in other parts later. Young stocks one or two years old are the most satisfactory.

Budding is best performed when there is still sufficient sap beneath the bark to permit of the latter being easily raised with a knife. On the other hand, if the work is done when the tree is still growing vigorously the bud is liable to be "drowned out," or, in other words, forced out by reason of too much sap and growth of the stock.

The stock which is to receive the bud should be at least three-eighths of an inch in diameter near the ground. The lower leaves are rubbed off to a height of five or six inches to enable the budger to work more freely. A perpendicular cut is now made in the stock as near the ground as possible from an inch to an inch and a half long and preferably on the north side of the tree, as the bud will not be so readily dried out by the sun on that side. The cut should only extend

through the bark. Another cut should now be made across the top of the perpendicular one. The two cuts when made will appear thus: T

The buds are cut from well developed and ripened shoots of the current season's growth of the variety it is desired to propagate. Before the buds are removed the leaves should be cut off the shoots; a piece of the petiole or leaf stem is left, however, by which the bud may be handled after it has been removed. A very sharp, thin-bladed knife is necessary in removing the bud. Knives are specially made for this purpose. The bud is cut off the shoot downwards or upwards, whichever is more convenient, the general practice, however, is to cut upwards. The length of the piece removed with the bud should be about one inch long, and the cut surface smooth. It should be quite thin, as but little of the wood is taken with the bud. The buds or twigs should be kept where they will not dry out while the work of budding is going on. The bud is inserted under the bark by raising the latter with the blade of the knife or the part of the budding knife made for that purpose. The bud is then pushed down and under the bark with the fingers, and finally the piece of leaf stalk which was left when it was removed from the twig is pressed with the blade of the knife to bring the bud into the proper position. The bark on each side of the bud, which should now be under the bark of the stock, will hold it in position. In order to bring the bud and stock into close contact and prevent the former from drying up before the union takes place,

they should be tied tightly together with raffia or some soft string taking care not to cover the bud with it. The bud should unite with the stock in two or three weeks, and after that time the string should be cut, as otherwise the bud may be injured. If the proper season has been chosen for the work the bud should remain dormant until the spring. If it starts in the autumn it may be killed during the winter. In the following spring the stock should be cut off just above the bud which will cause all the strength of the stock to be directed into the bud and produce rapid growth, three to five feet not being an exceptional growth for the first season.

Budding is a very popular method of propagating plums. The first season's growth is greater than from root-grafted trees and there is a larger proportion of straight trunked trees by this method. If it is desired also to prevent trees from growing on their own roots, budding is preferable, as trees propagated in this way may be planted so that the stock is just at the surface of the soil and all roots are thrown from it. We have not found root-grafting as successful with plums as with apples, and budding is recommended.

Buds may also be inserted in the branches of trees with good results. When the buds have united and grown the top may be shaped up as if top grafted, but this is seldom done with plums.

GRAFTING

Scions.—As much of the success in grafting depends on the condition and quality of the scions, too much stress cannot be laid on the importance of having them of the best quality and in the best condition at the time of grafting.



Sample of Shield-budding.

Scions may be cut any time after the wood is well ripened in the autumn and before the buds begin to swell in the spring. The best time, however, is in the autumn, as they may then be kept in the condition desired. If they are cut in cold weather, in winter, there is less sap in the scions at that time and thus the chance of their drying up is greater than if they were cut in the autumn. One cannot tell very well, either, in winter whether the young wood has been injured or not. Scions should be cut from healthy, bearing trees. The wood of old trees is liable to be diseased, and if diseased wood is used it is likely to produce a diseased tree when grafted. Scions should also be cut from the most productive trees. Occasionally, one or more trees of a variety will produce more and heavier crops than the others. If scions are taken from these trees, there may be a larger proportion of the grafted trees produce crops like the trees from which the scions were taken than they otherwise would, though this is not yet conclusively proven. The scions should be cut from the wood of the current season's growth, as older wood is not satisfactory. The buds should be well developed and the wood thoroughly ripened. It is not wise to use the water sprouts or young shoots which spring from the main branches or trunk for this purpose. They may not be thoroughly ripened, and it is also possible that sprouting propensities may be thus more developed in the grafted trees. The entire season's growth may be cut off and packed away until required for grafting, when it should be cut into pieces from four to six inches in length having three well developed buds.

Scions may be kept in good condition in moss, sawdust, sand, or forest leaves. The last named are found very satisfactory at Ottawa. These materials should be slightly moist, but not wet; the object being to keep the scions fresh and plump without there being any danger of their rotting. They should be kept in a cool cellar which is not too dry, and should remain dormant until ready for use.

Root - grafting. — Plums are propagated successfully by root - grafting, although budding is more general and gives, as a rule, much better results. Strong one year old or two year old stocks are heeled in during the autumn in a cool cellar in moist sand. Grafting may be done any time during the winter, but it is usually not started until January or February. Whip or tongue - grafting is the method usually employed. As only the root is required, the trunk and branches are cut off and thrown away. As there is but little advan-



Example of root-grafting.

tage in using the whole root, it may be divided into several pieces, much depending on its size. Each piece should be at least four inches long. A smooth, sloping cut upwards, about two inches long, is made across the main part of the root most suitable to receive the scion. The scion is prepared by cutting off a piece of the wood procured for this purpose in the autumn from four to six

inches long and with about three well developed buds on it; a smooth, sloping cut downwards and across it is now made of about the same length as that already made on the stock. Clefts are now made in the sloping surface of both scion and stock, in the former, upwards; and in the latter downwards. They are then joined together by forcing the tongue of the scion into the cleft of the stock. The inner bark, or cambium, of both scion and stock, should be in contact with one another on at least one side of the graft, as it is at this point of contact where the union begins to take place. In order to ensure a speedy and successful union, waxed cotton thread is wound tightly around to hold the parts together. Amateurs are also advised to rub grafting wax all over where the two parts are joined, as with this treatment, success is likely to be more certain.

The operation having been completed, the grafts are packed away in moss or sawdust until spring. They are then planted out in nursery rows about three feet apart and one foot apart in the rows, the point of union being about three inches below the surface of the soil. The ground should then be kept thoroughly cultivated throughout the season.

Crown-grafting.—Crown-grafting is usually done on young stocks in the nursery row in the spring. The trees are cut off at or just beneath the surface of the soil at the crown or collar. A sloping cleft is then made in the side of the crown and a scion, cut wedge-shape at the lower end, is inserted in the cleft. The same precautions should be observed as in root grafting, of having the inner bark of both stock and scion touching on at least one side. The grafted part should then be well covered with grafting wax, in order to exclude the air. The trees usually make a strong growth when grafted in this way, but as the work has to be done in April before growth begins it is often inconvenient to do it at that busy season of the year.

Top-grafting.—Plum trees are not top-grafted as frequently as apple trees, but they can be very successfully grafted in this way. When there are trees which produce poor or unprofitable fruit they may be made to bear good fruit by top-grafting other varieties upon them. An unsymmetrical top may also be improved by top-grafting. European or Japanese varieties should not be top-grafted on Americana or Nigra stock. In our experience at the Central Experimental Farm it has been found that although a good union is made, the European will outgrow the Americana so much that the top will die a few years after grafting, the trunk of the stock expanding too slowly. In top-grafting plums it is best to have both stock and scion as nearly related botanically as possible. Top-grafting is done in the spring before growth begins, and early grafting is more important with the plum than the apple. As the shock to a large tree would be very great if all the branches, on which leaves develop, were cut off the first season, about three years should be devoted to changing the top of the tree. Cleft-grafting is the method usually adopted in top-working plum trees, it being simple and satisfactory.

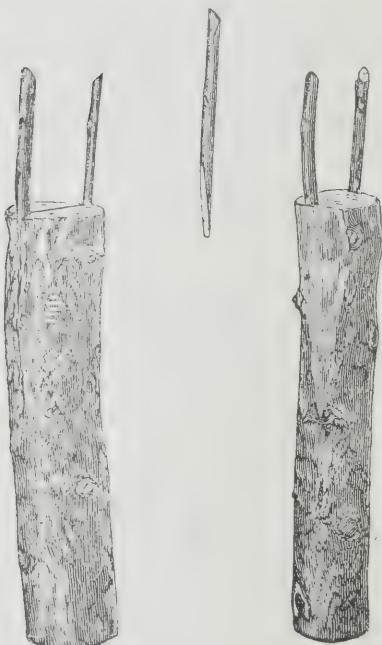
The branches to be grafted should not exceed one inch and a half or two inches in diameter. If they are larger, it is so long before the stub heals over, that disease may set in. It is possible, however, to graft larger branches by putting in more scions. The top-grafting of a large tree should be done with a view to having the new top as symmetrical as possible, and great care should be taken in selecting the branches to be grafted upon. After the branch is sawn off it is cleft by means of a mallet and strong knife to the depth of an inch and a half to two inches. It is held open to receive the scion by driving a wedge in it. Scions for use in top-grafting are cut from dormant wood which has been kept in good condition in the manner already described. They should have about three strong buds, and be cut wedge shape at the base, one side, however, being a little thicker than the other. Two scions are now inserted in the cleft of the stub, with the wide side of the wedge on the outside, and thrust down until the

lowest bud is almost on a line with the edge of the stub. The inner bark of both scion and stub should meet at some point, so that the union will take place readily, and this is more easily effected if the scion is given a slightly outward slope when inserted. When the wedge has been withdrawn from the cleft the advantage of having the wedge-shaped end of the scion thicker on one side will be apparent, as it will be held much more tightly than if both sides were the same. If the scion is not a tight fit all along, there is something wrong in the way it has been cut or the stub has been cleft. The cut parts should now be covered with grafting wax to exclude the air and hold the scion in place. Cotton is also sometimes wrapped around the wax in order to more effectively hold the scion in place. If both of the scions grafted on a stub should grow, the weaker one should be removed after the other is well united and the surface of the stub at least partially healed over.

It is often desirable to top-graft young trees, and this may be done very readily. The main branches are cut back to within a short distance of the trunk, and the scions grafted on, either by cleft or whip grafting. The closer

the grafted part is to the trunk, the better, as the tree will be stronger than if the union occurred further out on the limb, since the growth of graft and scion may not be equal. It is possible to cut off the whole top of the tree and graft successfully on the main trunk, when the tree is young, but unless one is sure that the union will be perfect and the top not outgrow the stock, it is better not to run the risk of losing the tree. Furthermore, if the whole top is cut off there will be such a growth the first season that the scions are liable to get broken off. In top-grafting a young tree that has been planted from three to five years, it is better to take two seasons to do the work, as the results will be, as a rule, more satisfactory.

It is necessary to examine the grafted trees during the summer and remove any young shoots from the stocks which are interfering with the scions. It is not wise, however, especially when the tree has been cut back severely for grafting, to remove all the shoots until the grafts have grown considerably and furnish a good leaf surface.



Cleft-grafting. Scions inserted in stumps.

MATERIALS NEEDED IN GRAFTING AND BUDDING

While grafting implements and appliances are numerous, the work can be done with a few, and as it is not often convenient for the farmer or fruit grower to get a large outfit, only the really necessary things are mentioned. These are: A sharp, fine-toothed hand saw, to be used for sawing off large limbs, or for making the stubs on trees to be top-grafted where the limbs are too large to be cut with the pruning knife.

A strong pruning knife for cutting the smaller limbs; for smoothing the wounds made by the saw or pruning shears; for trimming off torn edges of branches, and for pruning roots of young trees when planting.

A budding knife, with a thin steel blade, for removing buds, having an ivory handle which is made thin at the end and is used for raising the bark.

A grafting knife, which is used in top-grafting trees. Home-made grafting knives can be easily made. A strong, sharp blade is the chief requisite.

Pruning shears, which are intermediate in their uses between the saw and the pruning knife. They are used for cutting off branches which are too large for the latter and too small to need the saw; for rough pruning and for cutting scions.

A wedge and mallet are also necessary in top-grafting large trees.

Raffia, which is one of the best tying materials. It is very strong and very pliable, and is particularly useful for bandaging when budding.

Cotton yarn, which is used for tying root grafts, and is one of the most satisfactory materials for the purpose. The size known as No. 18 knitting cotton is the best. It is bought in balls, which should be soaked for a few minutes in melted grafting wax before using. The yarn may also be drawn through melted wax, which ensures its all being thoroughly soaked, and is, perhaps, on this account preferable to soaking the ball.

GRAFTING WAX

There are many kinds of grafting wax recommended, but it is unnecessary to enumerate them all. One of the cheapest and best is made as follows:—

Formula I.—Resin, 4 lbs.; beeswax, 2 lbs.; tallow, 1 lb. Melt together and pour into a pail of cold water. Then grease the hands and pull the wax until it is nearly white. A good wax for either indoor or outdoor use. This should be heated before using if too hard.

Formula II.—Resin, $2\frac{1}{2}$ lbs.; beeswax, $\frac{1}{2}$ lb.; boiled paint oil, 10 ounces. Make up as in Formula I. This wax is more suitable for outside in cool weather than Formula I, as it remains more pliable.

The principal value of grafting wax is to exclude air from the wound, and thus prevent the wood from drying before a union takes place. A good grafting wax should not crack when on the tree, else the air will reach the wound and the wax prove of little value. Many materials may be used instead of grafting wax for this purpose, one of the simplest being a mixture of clay and cow dung, but grafting wax is much to be preferred. Strips of cotton are often used, especially in top-grafting and crown-grafting, for wrapping around the wound after the wax has been applied for the purpose of helping to exclude the air, and also to assist in holding the scion in position until the union takes place. This cotton is unnecessary if good grafting wax is used; but if a very valuable variety is grafted it is safer to use the cotton, as when the growth of the scion is rapid there is a chance of its getting broken off during the first season before it is thoroughly united with the stock. Large wounds on trees should be covered with some material that will protect the cut surface from the weather, prevent disease from setting in, and which will not peel off easily. A good dressing of white lead paint is probably the best material to use for this purpose. Grafting wax may be used on smaller branches.

THE NURSERY

Although, as a rule, it will be the most convenient plan to buy trees from the professional nurseryman, yet he who propagates plum trees by root grafting, crown grafting, or budding, for his own use, should have a nursery in which to grow them until they are ready for the orchard. A good sandy loam soil, which does not bake and is well drained, is best suited for this purpose, and will grow the strong, healthy trees which are desired. The ground should be thoroughly prepared and the young trees planted about 12 inches apart, in

rows about 3 feet apart. Cultivation should be thorough up to about the middle of July, when it should cease, as in colder climates, especially, it is very desirable that the wood ripen well, and late cultivation would encourage late growth. It will be necessary the first year the grafted or budded trees are growing in the nursery to go over them carefully and cut out any shoots which may be coming from the stocks, and also to reduce the graft to one stem should more develop. If any side branches grow, however, they should be left intact. In small nurseries it is sometimes advisable to tie the young trees to stakes the first season. This will make them straighter and will help to keep them from being broken. These trees may be planted in the orchard the following spring if one-year old trees are to be used. By the end of the second year or the beginning of the third, after the branches have been pruned to the proper height and the tops shaped, the trees will be in the best condition for planting in the orchard.

THE ORCHARD

Soil and Exposure.—Plums will succeed well on a great many kinds of soils, but some appear to succeed better on certain soils than others, but the best soil depending somewhat on the climate in which the plums are grown. In those sections of Ontario where the European plums succeed best, well drained clay loam has given the most satisfactory results. Along the south shore of the St. Lawrence, below the city of Quebec, where the European plums succeed well, these plums do better on sandy loam soils. The Japanese plums on the whole give better results on warm loamy soils than on clay loam. The Americana and Nigra plums succeed best on clay loam soil, but also do well on sandy loam. All soils should be well drained or success need not be expected. The more severe the climate in which the plums are grown the warmer the soil should be.

If there is danger from spring frosts a northern or northeastern exposure would be likely to give best results, as the flower buds would not develop as soon as on a southerly exposure. The flower buds of the European and Japanese plums suffer badly in the north, and there is no doubt that a northerly exposure would be best for these plums.

Preparation of the land.—It very often happens that the farmer or fruit grower suddenly decides to plant an orchard. No previous thought had been given to the matter, or if there had, nothing was done to get the land into better condition for the young trees. The trees are bought, the land hastily, and not very well, prepared and the trees set out to take their chances. No after cultivation will fully make up for neglect of the thorough preparation of the land. Trees should begin to grow thrifitly from the time they are planted if they are to obtain a good size before they begin to bear heavily, and if the land is not thoroughly prepared and in good condition when they are planted, growth is likely to be slow. It is much better, if one has no land in good condition, to delay planting a year, and give the soil the necessary attention. The time will not be lost, as the trees will do much better. Land which has been well manured for root crops, ploughed in the autumn, and again ploughed in the spring and thoroughly levelled and pulverized with the harrow should be in good condition for planting the trees. If the subsoil is near the surface the subsoil plough should be used after the ordinary one, loosening the soil from four to six inches deeper than the former.

Sod land ploughed in the autumn, top dressed in the spring with a good coating of barn-yard manure and then ploughed again and thoroughly pulverized with the harrow should also bring the soil into good condition. A green crop, such as clover ploughed under in the spring and the land thoroughly harrowed, would also be a very good method.

Laying Out of the Orchard.—Plum trees require thorough spraying, and this should be taken into consideration when planting, so that the trees will not be set too closely. Trees should also have abundance of sunlight to thrive best and produce fruit of good colour, and they cannot obtain this if they are too crowded. There are several good methods which may be adopted in laying out the orchard.

If the trees are planted the same distance apart each way with a view to leaving them all as permanent trees, they should be planted from 15 to 20 feet apart, depending on the varieties chosen. If, however, the branching and upright growing varieties were mixed as might be necessary for good pollination, 18 feet apart would be a very satisfactory distance to plant.

Another good method is to plant the trees a greater distance apart one way than the other. This is a satisfactory system when properly carried out. By this plan trees may be planted successfully 10 feet apart in the rows with the rows 15 feet apart, the latter distance leaving ample room for spraying. When the trees become crowded, every other one may be taken out, thus leaving the permanent trees 20 by 15 feet apart.

A third method is to plant the trees in an apple orchard with the object of getting some profit from the land before the apple trees come into full bearing.

If the permanent apple trees were 35 by 35 feet apart, a row of plum trees $17\frac{1}{2}$ feet apart in the row could be planted between the rows of apple trees. Plum trees could also be planted between the apple trees in the rows. This would leave the plum and the apple trees $17\frac{1}{2}$ feet apart. Planted in this way, large crops of plums can be produced before it is necessary to cut the trees out. As plum trees require weaker spraying mixtures than apples, planting plums among apples is not recommended.

Windbreaks.—If the orchard is not naturally protected from the wind by trees or by rising ground, a windbreak may be planted with good effect along the north and west sides, or any other side from which the greatest injury comes, the object being not to stop the wind altogether, but simply to check its velocity, as if a windbreak is high and very dense it stops the circulation of air in the orchard to a large extent, and this gives favourable conditions for the spread of both insect pests and fungous diseases. On the other hand, a proper windbreak lessens the force of the wind and thus protects the trees, which will grow straighter and shapelier; it will also very materially lessen the amount of windfalls, and it will permit of growing varieties which will not succeed under ordinary exposure. Wind is one of the most important factors in drying out the land and causing drought. If its force is checked by a windbreak the evaporation of moisture from the soil will not be so great.

One of the best trees to plant for a windbreak is the Norway spruce (*Picea excelsa*). It is a rapid growing evergreen and is hardy almost everywhere where plums can be grown successfully. A single row of these trees planted from 8 to 10 feet apart is quite sufficient. They should grow, if properly cared for, at the rate of from 2 to 3 feet a year until they reach a height of 50 to 60 feet. In very exposed places it may be desirable to plant two rows of trees, the trees forming the second row being planted between 8 or 10 feet behind the trees in the first row. The first row may be composed of *arbor-vitæ*, which are rather slow growing, and the row behind made of Norway spruce, if desirable. White pine and European larch are rapid growing trees which may be used for this purpose. Scotch pine is inclined to be irregular in growth, and is, on this account, sometimes not satisfactory. If the trees already mentioned cannot be obtained there are other native trees which will give good satisfaction. The windbreak should not be planted nearer than 40 feet from the first row of fruit trees. The trees in the windbreak may be thinned out somewhat later on if desirable.

Kind of Trees to Plant.—Plum trees one or two years of age will give the best satisfaction. If the planter does all the cultivation himself, small trees will be more satisfactory, as they start more readily than larger ones, but if hired help is employed, a good sized tree is important, as small sized trees are liable to be tramped down or otherwise injured. The paragraph on stocks should be read carefully, as the stock of the plum plays an important part in the growth of the tree.

Planting.—The spring is the best time to plant plum trees, and the earlier it is done the better, providing the soil is dry enough to work without puddling. Plum trees suffer more from late planting than apple trees. The trees may be planted with success in the autumn if the work is done early, as they will throw out roots before winter, but if planted late they are very likely to be killed by drying out. As it is of the greatest importance to get the trees planted early in the spring, and as when ordered from nurserymen in the spring it is difficult to get them as early as required, a good plan is to order them to be delivered in autumn and when received heel them in well drained soil until spring. After the trees are taken out of the soil great care should be taken to prevent the roots from becoming dry before planting, as if they do the tree is almost sure to die. Dipping the roots in a thin mixture of clay loam and water will protect them somewhat, but wet burlap, old bags, or wet straw should also be used. Before exposing the roots of the trees, however, the holes should be made. Many planters seem to have the idea that if they dig a hole barely large enough for the roots to be crowded into they will have good results. Sometimes they do; much oftener they do not. If the whole field has been subsoiled and is in a thorough state of tillage it would not matter so much, as the soil all over would be in the same state of friability, but this is very rarely the case. So that, as a rule, it is necessary to make the hole somewhat larger than will accommodate the roots, spread out to their full extent. It should be made about 18 inches deep, after which the subsoil should be loosened a few inches more, but not removed. In digging the hole, the surface soil should be kept separate from the subsoil or that of poorer quality. Sufficient surface soil should now be thrown back in the hole to make the tree, when planted, about an inch deeper in the ground than it was before. If a tree is not planted deep enough, the roots may become exposed and the tree die. On the other hand, it should not be planted too deep. Before it is planted permanently in the hole, the soil which has been thrown in should be raised and rounded off in the centre. If this is done, the roots of the tree can be spread out much more readily and placed more in their natural position. Roots of plum trees have not many fibres, and it is necessary to spread what are left on the tree, carefully, in order to get the best results. Broken or bruised roots should be cut off before planting the tree.

The tree being now placed upright in the hole and the roots carefully spread out, the surface soil is gently thrown in and worked in among them, by the hand, if necessary. It is very important to have the soil come in close contact with the root fibres, in order that the best conditions may be afforded the tree to begin growth promptly. When the roots are well covered, more good soil should be thrown in, and when the hole is about half full it should be well tramped with the feet, after which the hole should be filled level with the surface of the soil, tramping being done while it is being filled. The surface of the soil should be left loose, as this will help to prevent evaporation of moisture from the soil which has been thrown in. It is not necessary to water any tree if planting is done at the proper season and the soil fairly moist and well compacted about the roots.

If one year old trees are used all side branches should be removed and the trunk pruned back to a height of two to three feet above the ground, leaving

the tree a mere whip. The branches of two year old trees should be pruned back so as to leave only about four buds on each, but from four to six branches are all that are necessary to make a good and symmetrical top, and others should be cut back to the trunk. The Stringfellow method of planting, which consists in cutting back the roots to a stub and the top to about eighteen inches from the ground and planting in a small hole, should be practised with caution in Canada, and is not recommended.

If the orchard is in an exposed position and the trees large and with high trunks, it will pay to tie stakes to them to keep them from getting loose.

In districts where drought is liable to occur, or even in places where the soil is likely to become rather dry, and thorough cultivation cannot be frequently given, it will be wise to mulch the newly planted trees to a depth of from 4 to 6 inches with manure, straw, sawdust, or anything of that nature which will not become a compact mass. If this is placed about the base of the tree and left during the summer it will keep the surface soil loose and prevent evaporation of moisture, and the growth of the trees will be much more rapid. A good mulch may be the means of preventing a tree from dying if the season is very unfavourable or the tree in poor condition. If the mulch is loose when winter sets in there may be danger from mice, and this should be guarded against.

VARIETIES

Although a large number of varieties of plums is now offered for sale by nurserymen, the number which can be recommended and suggested as worthy of trial is comparatively limited. Few additions have been made of late years to the list of best European plums, the greatest number of new named varieties having come either from the Japanese and Japanese hybrids or the Americana plums. Much improvement has been made in the Americana and other North American plums, and a great many named varieties have been introduced, no less than 169, exclusive of hybrids, having been tested at the Central Experimental Farm. The total number of named varieties of plums tested is 341.

The plum season extends over a period of about three months, beginning about the 1st of August, and ending late in October or early in November, although along the River St. Lawrence below the city of Quebec some European varieties will keep until December.

By a judicious selection, varieties may be planted which will give an unbroken succession of ripe fruit during this period. The market to which the plums are to be sent should also be carefully considered, as if they are to be sent long distances the firmer varieties will be the most satisfactory.

Although the varieties recommended are likely to be the most suitable, the intending planter should learn what varieties are proving the most profitable in his vicinity. This is important, as the districts are large and conditions will vary somewhat from one end of a district to the other. The lines dividing the districts are not arbitrary. It is not possible to make an exact dividing line on one side of which a variety will do well and on the other side of which it will prove a failure. The boundary lines are suggestive only. It is often the case that there will be especially unfavourable locations for orchards in a milder district in which it would be safer to plant the varieties recommended for a colder one. The planter should use his judgment in the matter. It was only through the kindness of a large number of Canadian fruit growers that it has been possible to prepare a list of the best varieties for the different districts. These men have given the results of their experience most willingly, and I take this opportunity of again thanking them publicly for their assistance.

Following is a list of the varieties recommended for different parts of Canada.

VARIETIES OF PLUMS RECOMMENDED FOR DIFFERENT PARTS OF CANADA

PRINCE EDWARD ISLAND

Commercial.—Field, Quackenboss or Glass, Shropshire Damson, and Prince of Wales in limited numbers.

Additional Varieties Suggested for Home Use.—Washington, Imperial Gage, Bradshaw, Victoria and Reine Claude (Bavay).

NOVA SCOTIA

Counties of Cumberland, Colchester, Pictou, Antigonish, Inverness, Victoria, Cape Breton, Richmond, Guysborough, Halifax:—

Commercial and Domestic.—Arctic, Bradshaw, Green Gage, Imperial Gage, Gueii, Lombard, Shipper's Pride, Yellow Egg, Quackenboss or Glass, Reine Claude (Bavay), Shropshire Damson.

Counties of Hants, Kings, Annapolis, Digby, Yarmouth, Shelburne, Queens, Lunenburg:—

Commercial.—Bradshaw, Diamond, Yellow Egg, Archduke, Grand Duke, Monarch, Golden Drop (Coes), Tenant Prune, Shropshire Damson.

Additional Varieties Suggested for Home Use.—Bradshaw, Washington, Imperial Gage, Reine Claude (Bavay).

Some of the most desirable Japanese and hybrid plums are Red June, Abundance, Burbank, Shiro, and Apple, but these are not so reliable as the European plum.

NEW BRUNSWICK

Lower St. John Valley, Charlotte, and Albert Counties near the coast:—

Commercial and Domestic.—Arctic, Lombard, Green Gage, Yellow Egg, Quackenboss, Glass, Mount Royal, Raynes.

Remainder of New Brunswick: (Americana, Nigra and Hybrid)—Bixby, Mankato, Omaha, Cheney, Waneta, Schley, Brackett, Hawkeye, Stoddard.

ONTARIO

Counties of Essex, Kent, Bothwell, Elgin, Norfolk, Haldimand, Welland and Lincoln, and the southern part of the counties of Lambton, Middlesex, Oxford and Wentworth:—

European Varieties Recommended for Market.—Bradshaw, Imperial Gage, Field, Reine Claude (Bavay), Italian Prune, Grand Duke, Shropshire Damson, Monarch.

European Varieties Recommended for Home Use.—Washington, Burbank, Bradshaw, Imperial Gage, Reine Claude (Bavay), Italian Prune.

Counties of Wellington, Dufferin, Waterloo, Halton, Peel, and Brant and the eastern part of Oxford, the northern part of Wentworth, the western part of York and the southern part of Simcoe:—

European Varieties Recommended for Market.—Gueii, Imperial Gage, German Prune, Glass, Reine Claude (Bavay), Shropshire Damson.

Additional Varieties.—Mount Royal, Raynes.

Varieties Recommended for Home Use.—Washington, Bradshaw, Imperial Gage, Reine Claude (Bavay).

The northern part of Lambton, Middlesex and Oxford; the counties of Perth, Huron, Bruce and Grey and the county of Simcoe, with the exception of the extreme southern portion.

European Varieties Recommended for Market.—Bradshaw, Purple Egg, Imperial Gage, Lombard, Quackenboss or Glass, Yellow Egg, Reine Claude (Bavay), Monarch, Grand Duke.

Varieties Recommended for Home Use.—Washington, Burbank, Bradshaw, Imperial Gage, McLaughlin, Monarch, Reine Claude (Bavay).

The county of York, with the exception of the extreme western portion, and the counties of Ontario, Durham, Northumberland, Prince Edward, Lennox, Frontenac, to Kingston, and Hastings and Addington, within thirty miles of the St. Lawrence River; also the southern portion of Victoria and Peterborough.

Varieties Recommended for Market.—Bradshaw, Gueii, Imperial Gage, Lombard, Quackenboss or Glass, Yellow Egg, Reine Claude (Bavay), Monarch.

Varieties Recommended for Home Use.—Washington, McLaughlin, Burbank, Bradshaw, Imperial Gage, Monarch, Reine Claude (Bavay), Shropshire Damson.

Counties of Leeds, Grenville, Dundas, Stormont.

Varieties Recommended for Market and Home Use.—(Americana, Nigra and Hybrid)—Bixby, Mankato, Omaha, Cheney, Waneta, Schley, Brackett, Stoddard, Emerald. (European, for trial in most favourable locations)—Early Red Russian, Lunn, Mount Royal, Raynes, Latchford, Richland, Gueii, Glass, Arctic, Lombard, White Nicholas, Yellow Egg. European plums are not very satisfactory in this district, as the fruit buds of most varieties are usually killed by winter. (Japanese varieties)—Not hardy.

The counties of Victoria, Peterborough, Hastings and Addington, except the southern portions; Manitoulin and St. Joseph Islands, and the counties of Renfrew, Lanark, Carleton, Russell, Prescott, Glengarry.

Varieties Recommended for Market and Home Use.—(Americana, Nigra and Hybrid)—Earliest and best native seedlings, Bixby, Mankato, Omaha, Cheney, Waneta, Emerald, Schley, Brackett, Stoddard. European, Suggested for Trial in Most Favourable Locations)—Early Red Russian, Rowley, Lunn, Mount Royal, Raynes, Latchford, Richland, Glass, Montmorency, White Nicholas, Yellow Egg, Ungarish. None of the European plums are very satisfactory in this district, as the fruit buds of most varieties are usually killed by winter. (Japanese varieties)—Not hardy.

Most northerly districts: (Nigra and Hybrid)—Best early native seedlings, and Aitkin, Cheney, Mankato, Sapa and Opata.

QUEBEC

Counties of Pontiac, Wright, and Ottawa, south of latitude 46°, also the counties of Argenteuil, Two Mountains, Terrebonne, L'Assomption, and Montcalm, Joliette, Berthier, Maskinonge, and St. Maurice, within 25 miles of the St. Lawrence River.

Varieties Recommended for Market and Home Use.—(Americana, Nigra and Hybrid).—Earliest and best native seedlings and Bixby, Mankato, Omaha, Cheney, Waneta, Brackett, Emerald, Stoddard. (European, suggested for trial in most favourable locations)—Early Red Russian, Rowley, Lunn, Mount Royal, Raynes, Latchford, Richland, Glass, Montmorency, White Nicholas, Yellow Egg, Ungarish.

None of the European plums are very satisfactory in this district, as the fruit buds of most varieties are usually killed by winter. (Japanese varieties)—Not hardy.

Counties of Huntingdon, Beauharnois, Chateauguay, Jacques Cartier, Laval, Hochelaga, Chambly, Laprairie, Napierville, St. Johns, and the western part of Iberville and Missisquoi.

Varieties Recommended for Market and Home Use.—(Americana, Nigra and Hybrid) Earliest and best native seedlings, Bixby, Mankato, Omaha, Cheney, Waneta, Schley, Brackett, Emerald, Stoddard. (European, for trial or home use in most favourable locations) Queen May, Brodie, Ungarish, Lunn, Mount Royal, Raynes, Montmorency, Arctic, Glass, Yellow Egg, Richland, Early Red Russian, White Nicholas, Lombard, Damson. (Japanese varieties) Not hardy, except in most favourable places.

Counties of Vercheres, Richelieu, Yamaska, St. Hyacinthe, Rouville, Bagot, Drummond, Richmond, Shefford, Sherbrooke, Brome, Stanstead, and the eastern part of Iberville and Missisquoi, and the western part of Compton.

Varieties Recommended for Market and Home Use.—(Americana, Nigra and Hybrid) Best early native seedlings and Bixby, Mankato, Omaha, Cheney, Waneta, Schley, Emerald, Stoddard, Brackett. (European, for trial and home use in most favourable districts) Mount Royal, Raynes, Montmorency, Glass, Richland, Early Red Russian, White Nicholas, Yellow Egg, Damson. (Japanese varieties) Not hardy.

Counties of Nicolet, Arthabaska, Wolfe, the eastern part of Compton, and the counties of Beauce, Megantic, Dorchester, Lotbiniere, Levis and Bellechasse.

Varieties Recommended for Market and Home Use.—(Americana, Nigra and Hybrid) Best early native seedlings, Bixby, Mankato, Omaha, Cheney, Waneta, Schley, Brackett, Hawkeye, Stoddard. (European, suggested for trial and home use in most favourable locations) Mount Royal, Raynes, Montmorency, Lunn, Queen May, Early Red Russian, White Nicholas, Yellow Egg, Arctic, Ungarish. (Japanese varieties) Not hardy.

Counties of Montmagny, L'Islet, Kamouraska, most of Temiscouata, Bonaventure, and Gaspe, on the Bay of Chaleur side of Gaspe Basin.

Varieties Recommended for Growing near the St. Lawrence River.—(European) Arctic, Washington, Bradshaw, Yellow Egg, Gueii, Pond, French Damson, Quackenboss, Grand Duke. (Additional varieties suggested) Mount Royal, Raynes.

Varieties Recommended for Home Use.—Mirabelle précoce, Washington, Imperial Gage, Green Gage, Montmorency, Arctic, Lombard, French Damson.

Varieties Recommended for Growing Inland.—(Americana and Nigra) Best early native seedlings and Aitkin, Bixby, Mankato, Omaha, Cheney, Waneta, Schley, Brackett.

Counties of Champlain, Portneuf, Quebec, Montmorency, Charlevoix, and Chicoutimi, east of the St. Maurice River, and southwest of Lake St. John and the St. Lawrence River.

Varieties Recommended for Inland.—Best early native seedlings and Aitkin, Omaha, Cheney, Bixby, Mankato, Brackett, Waneta.

Near the St. Lawrence River, especially in the vicinity of Quebec and below and on the Island of Orleans, the following European varieties would give more or less satisfaction: Bonne Ste. Anne, Washington, Green Gage, Arctic, Montmorency, Mount Royal, Raynes, Lombard, Damson.

North of latitude 46° as far as plums will grow; also the northeastern part of Temiscouata, Rimouski, and Matane.

Varieties Suggested.—Best early native seedlings and Aitkin, Odegard, Bixby, Mankato, Cheney, Omaha, Sapa and Opata.

MANITOBA

Varieties Recommended.—Cheney, Aitkin, Odegard, Assiniboine, Mammoth, Pembina, Sapa, Opata, and best seedlings of Manitoba native plum.

SOUTHERN MANITOBA

Varieties Recommended.—Cheney, Aitkin, Odegard, Assiniboine, Mammoth, and best early native seedlings, also Sand Cherry and Compass Cherries, which are more like plums than cherries. There are a number of useful varieties among Hansen's plums, such as Etopa, Sansoto, Opata, Sapa, Kaga, Cree, Pembina, Ojibwa.

SASKATCHEWAN

Varieties Recommended.—Cheney, Aitkin, Odegard, Assiniboine, Sapa, Opata, and best early seedlings of Manitoba native plums.

ALBERTA

Varieties Recommended.—Best seedlings of Manitoba native plum and Cheney, Aitkin, Odegard, Assiniboine, Sapa and Opata.

BRITISH COLUMBIA; VANCOUVER ISLAND—SOUTHERN PART

Commercial.—Italian Prune, Diamond, Pond, Monarch, Damson.

Additional Varieties for Domestic Use.—Peach, Bradshaw, Washington.

Lower Mainland

Commercial.—Monarch, Italian Prune, Diamond, Grand Duke, Maynard, Damson.

Additional Varieties for Home Use.—Peach, Green Gage, Imperial Gage, Washington.

Dry districts, including Lytton, Lillooet, Spence's Bridge, Kamloops, Okanagan Lake, Kettle River Valley.

Commercial.—Most profitable: Italian Prune. Others: Bradshaw, Pond, Grand Duke.

Additional Varieties for Home Use.—Peach, Victoria, Yellow Egg.

West Kootenay

Commercial.—Bradshaw, Pond, Diamond, Monarch, Golden Drop (Coes), Yellow Egg, Damson, Italian Prune.

Additional Varieties for Home Use Especially.—Peach, Imperial Gage, Washington, Victoria and Reine Claude (Bavay).

Shuswap Lake District

Commercial.—Bradshaw, Pond, Italian Prune.

Additional Varieties for Home Use Especially.—Peach, Washington, Victoria, Reine Claude.

Newer and Colder Districts

Hardest Varieties for Trial.—Arctic, Bradshaw, Gueii, Lombard, Yellow Egg, Quackenboss or Glass.



Burbank plum. (*Prunus triflora*)

DESCRIPTIONS OF VARIETIES

The following descriptions were, most of them, made by the author from specimens either grown at the Central Experimental Farm or in other parts of Canada. In some cases, however, especially among the European plums, the descriptions were obtained from other sources which are considered reliable. Where these descriptions are used the author's name is given. The varieties which are described are divided into the various groups to which they belong. They are limited to those mentioned in the district lists, with the exception of a few new kinds considered promising, but which have not been tested long enough to recommend, and a few of the older varieties.

EUROPEAN VARIETIES

Abegweit.—Plum seedling from Henry E. Wright, Summerside, P.E.I.—Form round oval; size large; cavity medium depth and width; suture distinct, slightly depressed; apex slightly depressed; colour yellow, well covered with deep red; dots obscure; bloom, none on specimens received; skin moderately thin, rather tough; flesh yellow, juicy; stone medium to below, oval, flattened, cling; sweet, rich flavour; quality very good. A handsome plum and one worth testing. Raised from stone of a plum from California. Bore first time in 1903. Tree a fast grower. Ripens a few days later than Moore's Arctic and earlier than Lombard. Tree 6 or 7 years old from seed in 1903. Domestica group.

Agen.—A very old French variety of unknown origin.

“Fruit late, season short; one and one-half inches by one and one-eighth inches in size, obovate, the base necked, halves equal, cavity shallow, narrow, flaring; suture very shallow, indistinct; apex roundish or flattened; colour, reddish or violet-purple, overspread with thin bloom; dots numerous small, brown, obscure, clustered about the apex and interspersed between russet flecks; stem thick, seven-eighths inch long, glabrous, adhering well to the fruit; skin thin, tough; flesh greenish yellow, tender, sweet, aromatic; very good to best; stone semi-free or free, seven-eighths inch by one-half inch in size, oval, flattened, with pitted surfaces, rather abrupt at the base and apex; ventral suture somewhat narrow, furrowed, with distinct wing; dorsal suture widely grooved.” (Plums of New York.)

The tree is an upright, spreading variety, and very productive, and one of the best for prunes though the fruit is rather small in some places.

Amaryllis (Seedling of Mirabelle).—Fruit above medium to large, roundish to heart-shaped; cavity medium depth and width, abrupt; stem medium to long, moderately stout; suture distinct, slightly depressed; apex rounded; colour greenish yellow; dots moderately numerous, indistinct; skin moderately thick, moderately tender; flesh yellow, juicy; stone medium size, oval, cling; sweet, rich flavour; quality very good. Grown from seed of Mirabelle in 1890. Began to bear in 1896. Tested September 30, 1902. Originated by Aug. Dupuis, Village des Aulnaies, P.Q.

Arctic (Moore's Arctic).—Fruit medium to below medium in size, roundish or somewhat oval; colour, dark purple, almost black; bloom thin, blue; suture indistinct; flesh greenish yellow, juicy, moderately sweet; quality medium; season early September. Tree vigorous and a good cropper. Hardier than some European plums, but not desirable where the best varieties succeed, as it is too small and not good enough in quality.

Bradshaw (Niagara?).—Fruit above medium to large, obovate; dark purplish red with a bluish bloom; dots few; cavity narrow, shallow; stem medium length, moderately stout; suture distinct but shallow; apex rounded;

skin rather thick, tough; flesh greenish yellow, juicy, moderately firm, sweet, with a rich flavour; stone semi-cling; quality good. Season middle of August to first week of September. Tree a strong upright grower, and very productive.

Brodie.—Fruit below medium size, almost round; colour, dark purple with a blue bloom; dots obscure; suture merely a distinct line; skin thin, tender; flesh greenish yellow, juicy, moderately firm, sweet, rich flavour; stone small, roundish, semi-cling; quality good to very good; season second and third weeks of September. A good dessert plum, but rather small for market. Specimens received from R. Brodie, Montreal, Que. Tree has been on Mr. Brodie's place since his grandfather's time. Thought to be a seedling.

Diamond.—Fruit medium to large, oval; colour, dark blue, with a heavy blue bloom; dots obscure; cavity narrow, abrupt; stem short to medium, rather stout; suture merely a distinct line, not depressed; flesh yellow, moderately juicy; quality medium. Season medium. Tree a strong grower and very productive.

Early Red Russian.—Fruit medium size, oval; cavity narrow, shallow, abrupt; stem medium length, slender; suture an indistinct line, no depression; apex rounded; colour dull purplish red; dots moderately numerous, yellow, distinct; bloom thin, blue; skin fairly thick, moderately tender; flesh yellowish green, juicy; stone medium size, long, oval, cling; moderately sweet with an acid aftertaste; quality medium. Season late September. Of the Lombard type. Imported from Russia by Prof. Budd from Dr. Regel, St. Petersburg, during the winter of 1881-2. Prof. Budd, writing in 1890, said of this plum: "This was sent out quite extensively eight years ago marked 'Mixed Arab.' The sorts mixed were Early Red, White Nicholas and Black Arab." Most of the trees proved to be Early Red Russian No. 3. There is still some doubt regarding this plum, which may be the variety sent out by Prof. Budd as White Nicholas. Another variety, called Late Red, somewhat like this one, which may be the true Early Red, ripens at Ottawa during the last week of August.

Emerald.—Fruit above medium size, oval; colour yellow; suture distinct; flesh yellow, juicy, sweet, good, rich flavour; stone free; quality good to very good. Specimens received on August 4, from E. D. Smith, Winona, Ont. Said to ripen by the end of July. Originated by the late Warren Holton, Hamilton, Ont. Has not succeeded well.

Engelbert.—A seedling of the "Date Prune," originating in Belgium, and of the prune type.

"Fruit mid-season, ripening period short; one and five-eighths inches by one and three-eighths inches in size; oval, swollen on the suture side, halves equal; cavity shallow, narrow, abrupt; suture a line; apex bluntly pointed or roundish; colour dark purplish black, overspread with thick bloom; dots numerous, russet; stem three-quarters inch long, pubescent, adhering well to the fruit; skin thin, sourish, separating readily; flesh golden-yellow, juicy, coarse, rather firm, sweet, pleasant-flavoured, sprightly; good; stone one and one-eighth inches by five-eighths inch in size, oval or broadly ovate, strongly flattened, with roughened and deeply pitted surfaces, blunt at the base and apex; ventral suture narrow strongly grooved, not prominent; dorsal suture acute, with a shallow, often indistinct groove." (Plums of New York.)

Tree productive. A good shipping plum, and doing well in Western Canada.

Field.—A seedling of Bradshaw grown in Schoharie County, New York.

"Fruit mid-season, period of ripening short; one and seven-eighths inches by one and five-eighths inches in size; oblong-oval, compressed, halves equal; cavity shallow, narrow, abrupt; suture shallow, broad; apex roundish; colour dark purplish-red, overspread with a very thick bloom; dots numerous, small, russet,

clustered about the apex; stem three-quarters inch long, sparingly pubescent, adhering well to the fruit; skin thin, slightly sour, separating readily; flesh greenish-yellow, medium juicy, sweetish, mild; of fair quality; stone clinging, one inch by five-eighths inches in size, ovate, with roughened and deeply pitted surfaces, blunt at the apex and base; ventral suture broad, distinctly furrowed; dorsal suture acute." (Plums of New York.)

This variety has done well on Prince Edward Island, and appears harder in flower bud than some other European varieties: The tree is of an upright-spreading habit and quite productive.

German Prune.—"Fruit small to medium; long oval; cavity very shallow; stem rather slender, medium long; suture hardly more than a line; apex somewhat pointed; colour blue; dots few, scattered; bloom blue; flesh greenish or slightly yellow; stone small, oval, pointed, moderately flattened, very free; quality hardly more than fair; season medium; tree strong, tall grower, productive." (Waugh). This has long been a popular plum.

Glass (Glass seedling).—Fruit large roundish, deep purple with a blue bloom; suture very shallow, indistinct; stem medium length, slender; flesh yellow with a shade of green, juicy, moderately sweet; skin medium in thickness, tender; stone medium size, cling; quality medium. Season, second and third weeks of September. Tree a strong grower and productive where it succeeds well. Very similar, if not identical with Quackenboss.

Golden Drop (Coe's Golden Drop).—"Fruit large to very large; oval with a short neck, the two halves unequal; cavity very shallow and abrupt; stem medium length, stout, suture deep; apex somewhat depressed; colour golden yellow; dots very many, yellow; bloom yellow; flesh firm, meaty; stone medium large, long, pointed, somewhat flattened, ribbed at the edge, half free; quality good; season medium late. Tree a good grower with large, coarse, rough foliage." (Waugh).

Grand Duke.—"Fruit large to very large obovate; cavity narrow, shallow; stem an inch long; suture rather deep; colour very dark blue; bloom heavy, blue; flesh yellow, firm; stone oval, hardly flattened cling; quality good; season late. Tree moderately vigorous with a spreading open head. Regarded by many as one of the very best late shipping plums." (Waugh). This is a favourite plum in some parts of the best plum districts of Ontario.

Gueii.—"Fruit medium size; oval, cordate; cavity shallow; stem an inch long, pubescent; suture shallow; apex somewhat pointed; colour blue; dots not visible; bloom blue; flesh greenish yellow; stone medium size, round oval, oblique pointed, cling; quality fair; season medium." (Waugh).

Imperial Epineuse.—A promising prune plum of very good quality, which has done well in parts of New York State. It is one of the largest of the prune plums and of handsome appearance. The season is rather late.

Imperial Gage.—Fruit medium to above medium in size, roundish; colour yellowish green; dots indistinct; cavity narrow, medium depth; stem medium to long, moderately stout; suture distinct but very slightly depressed; skin fairly thick, rather tough; flesh yellowish green, firm, juicy, sweet, rich flavour; stone medium size, oval, semi-cling to almost free; quality very good. Season early September. Tree a strong grower and very productive.

Italian Prune (Fellenberg).—"Fruit medium to large, elliptical, straighter on one side and longer on the other; cavity very shallow; stem nearly as long as the fruit; suture shallow; colour dark blue; dots not many, dull yellow; bloom blue; skin thin; flesh greenish yellow; stone medium size, oval, pointed, rough, ridged at edge, quite free; quality good to extra; season late; tree rather spreading." (Waugh).

This is one of the most satisfactory European plums both for home use and for market.

Jefferson.—“Fruit medium to large, round or round oval; cavity very shallow; stem medium short; suture, hardly any; apex very slightly depressed; colour greenish yellow; dots many, greenish; bloom white; skin thin and tender; flesh yellow; stone medium size, blunt, with a short neck, slightly flattened, rough, free; flavour, rich and sugary; quality good to best; season medium late; a good tree.” (Waugh). One of the finest varieties for home use.

Kingston Sugar, from R. A. Morrison, Cataraqui, Ont.—Heart-shaped; above medium size, $1\frac{1}{2}$ by $1\frac{1}{2}$ inches; cavity shallow, medium width; stem medium length; moderately stout; suture a distinct line, very slightly depressed; apex rounded; green with traces of yellow; dots indistinct; bloom moderate, bluish skin moderately thick, moderately tough; flesh yellowish-green, juicy; stone medium size, oval, cling; flavour sweet, good; quality very good.

Said to be hardier than Lombard and some other sorts. A promising plum. *Reine Claude* group.

Latchford.—Fruit large, oval, deep purple with a blue bloom; suture obscure; cavity narrow, shallow; stalk three-quarters of an inch long; flesh greenish yellow, juicy, sweet; stone medium size, oval, cling, quality good. Season mid to late September. Originated in Ottawa. Tree lived to be over fifty years of age. Brought into notice by F. R. Latchford, Ottawa.

Lombard.—Fruit medium size, oval, slightly flattened at ends; colour purplish red with a thin blue bloom; dots fairly numerous, yellowish, distinct; stem short, slender; suture shallow, indistinct; skin rather thin, tender; flesh yellow, juicy, sweet, but not rich, firm; stone medium size, cling; quality medium; season second and third weeks of September. Tree vigorous and a very heavy bearer. One of the hardiest of the European plums.

Lunn (Montreal No. 60).—Fruit received from W. W. Dunlop, Outremont, Que.).—Fruit large, oval, broad (round oval); cavity shallow, medium width, slightly flaring; stem medium length, $\frac{1}{2}$ -inch, stout; suture a distinct line, very little if any depression; apex rounded, very slightly flattened; colour dark purple; dots fairly numerous, irregular, indistinct, brownish; bloom moderate, blue; skin moderately thick, tough; flesh yellowish green, very juicy, fairly firm; stone large, oval, cling; sweet, rich; quality very good. Season early to middle of September. A fine dessert plum.

Monarch.—“Fruit large, roundish oval; cavity deep, broad rounded; stem short and stout; suture hardly visible; colour dark purplish; bloom heavy bluish; flesh yellowish; stone free; quality good; season late. An English variety lately introduced into this country, and thought to be a valuable late shipping plum” (Waugh.) This plum has proved to be one of the best.

Montmorency (Reine Claude de Montmorency).—Fruit medium size, almost round; cavity narrow, abrupt, rather shallow; stem short to medium, moderately stout; suture indistinct, sometimes very slightly depressed; apex rounded or slightly flattened; colour yellow and greenish yellow before quite ripe with a light orange blush or dots of orange on sunny side; dots obscure; bloom thin, white; skin moderately thick, tough; flesh yellow, very juicy, moderately firm, sweet, rich; stone small, oval, almost free; quality very good.

Mountain.—Fruit received from W. W. Dunlop, Outremont, Que.—Fruit medium to above medium size, roundish, flattened slightly at ends; cavity medium depth and width, slightly flaring; stem medium to long, moderately stout; suture distinct, usually slightly depressed; apex slightly flattened; colour greenish yellow, more or less overspread with dull coppery red; dots numerous, yellow, distinct; bloom thin, bluish; skin moderately thick, tough; flesh yellowish

green; stone above medium, broad, roundish, cling; sweet, rich; quality very good. Season early to middle September. An excellent dessert plum. Well worth propagating.

Mount Royal (Dunlop 54.)—Fruit received from W. W. Dunlop, Outremont, Que. Fruit medium size, roundish flattened at stem end; cavity medium to open, medium depth, somewhat flaring; stem short to medium moderately stout; suture distinct, very slightly depressed; apex rounded, slightly flattened; colour dark purple; dots numerous, irregular, distinct; bloom blue, moderate; skin moderately thick, fairly tender; flesh greenish yellow, juicy, firm, sweet, moderately rich flavour; stone below medium, roundish, cling; quality good. Season early to mid-September. Should be a good shipping plum.

McLaughlin.—“Fruit medium size, round or even oblate; cavity shallow, with a ridge around the stem; stem strong, rather long; suture very shallow; apex very slightly depressed; colour greenish yellow with a pink blush; dots many, greenish; bloom white; skin thin; flesh yellow; stone medium size, oblique oval, slightly flattened, rough, cling, flavour rich, sugary; quality extra. Season medium. Tree hardy and a fairly good grower.” (Waugh.)

One of the best varieties for home use, the quality being exceptionally good. It is of the Green Gage type.

Peach.—“Fruit early; thick-set, without a neck; one and seven-eights inches in diameter; roundish, slightly angular, halves equal; cavity deep, wide, compressed; suture shallow, distinct; apex flattened or depressed, colour dark purplish-red; overspread with thin bloom; dots numerous, large, conspicuous; stem eleven-sixteenths inch long, glabrous, adhering well to the fruit; skin tough, adhering; flesh golden yellow, medium juicy, firm, sub-acid, mild; good; stone free, one inch by three-quarters inch in size, roundish oval, flattened, with rough and pitted surfaces, blunt at the base and apex; ventral suture wide, prominent, often distinctly winged; dorsal suture with a wide, deep groove.” (Plums of New York.)

The Peach is an old variety of unknown origin. In Canada it is grown mainly on Vancouver Island and the Lower Mainland of British Columbia, where, though very susceptible to rot, it succeeds very well. The tree is a very vigorous grower and moderately productive.

Peters (Peters' Yellow Gage).—“Fruit medium to large; round oval; cavity medium, shallow, abrupt; stem long, pubescent; suture shallow; apex slightly depressed; colour greenish yellow, sometimes with a slight blush; dots many, yellow; bloom white; skin thin; flesh greenish yellow; stone medium, oval, pointed, hardly flattened; cling, quality good to best. Season early. Tree moderately vigorous and upright. A good amateur variety of the Green Gage type.” (Waugh.)

Pond (Pond's Seedling).—Fruit very large; nearly oval, but tapers slightly towards cavity; colour purplish red; bloom purplish; dots numerous, dull yellow, distinct but not prominent; cavity narrow, shallow; stem medium length, fairly stout; suture distinct and but slightly depressed; skin thick, rather tough; flesh yellow, juicy, sweet, good flavour; stone large, rough, cling; quality good. Season early September. Tree a strong grower and quite productive.

Quackenboss.—“Fruit medium size or larger; round oval; cavity shallow, flaring; stem rather long; suture a line; colour blue; dots blue; bloom blue; skin thin; flesh greenish; stone oval, pointed flattened, cling; quality fair to good. Season medium. A good rapid growing tree and fairly productive.” (Waugh.)

Ripens in Ontario in second and third weeks of September.

Queen May.—Fruit large, roundish, almost perfectly round; colour greenish yellow splashed with pale green when not ripe; bloom thin, pale bluish; dots small, pale, indistinct; cavity narrow, medium depth; stem medium length to rather long, fairly stout; suture indistinct; apex rounded; skin moderately thick, tough; flesh greenish yellow, very juicy, moderately firm, sweet, rich flavour; stone medium size, almost oval, cling; quality very good; season September. Tree a strong, moderately spreading grower, fruiting heavily when young, but does not live very long. A very promising dessert plum. Specimens received from N. E. Jack, Chateauguay Basin, Que., who is growing trees received from Thos. Clark, Chateauguay. Thought to be a seedling.

Raynes (Dunlop 53).—Fruit received from W. W. Dunlop, Outremont, Que.—Fruit above medium to large; oval, long, flattened on side of suture; cavity medium depth and width, abrupt; stem medium length, moderately stout; suture, distinct, slightly depressed; apex rounded; colour dark reddish purple; dots small, numerous, indistinct; bloom moderate, blue; skin thin, tender; flesh yellowish green, firm, fairly juicy; stone above medium to large, long, oval, free; moderately sweet; quality above medium. Season early to middle of September. A prolific bearer and should be a good shipper. A prune plum.

Reine Claude (Bavay).—Fruit large, roundish, slightly flattened at ends; colour greenish yellow with green splashes; bloom thin, pale; suture medium depth; stem short, stout; flesh yellow, juicy, melting, sweet, rich, very good flavour; stone free; quality very good; season late September to early October. Tree vigorous, very productive. One of the best both for home use and for market.

Richland.—Fruit medium to above medium size, oval; cavity narrow, medium depth, abrupt; stem medium length, $\frac{3}{4}$ -inch, slender; suture a distinct line, no depression; apex rounded; colour deep purplish red; dots fairly numerous, yellow, indistinct; bloom moderate, blue; skin thick, fairly tender; flesh greenish yellow, juicy, moderately firm; stone medium size, oval, flat, cling; sweet but not rich; quality above medium. Season middle of September. Hardier than most European sorts. Originated on the farm of Randall Elden, Richland, Pennsylvania.

Rowley.—Fruit above medium size, round, dark purplish red with a bluish bloom; dots obscure; suture an indistinct line; apex rounded; skin thin, moderately tough; flesh yellow, moderately juicy, firm, sweet rich flavour; stone medium size, oval, slightly flattened, cling; quality good to very good. Season end of August and first week of September. A promising seedling originated by Jos. Rowley, Cummings Bridge, Ont. (near Ottawa). Said to fruit well nearly every year.

Shropshire (Damson).—"Fruit small, oval; cavity, hardly any; stem about one-half inch long; suture none; colour dark blue; dots, none visible; bloom blue; skin firm; flesh greenish, sour; stone small, oval turgid, cling; quality fair. Tree a good grower and enormously productive." (Waugh.)

This is a popular damson in Canada.

Splendor.—"Was originated by Luther Burbank in 1886 from a cross between Pond and Agen. In 1893 it was sold under the name Cross-bred Prune A.P.-318, to Stark Brothers, Louisiana, Missouri, who introduced it the following year under its present name. The fruit is twice the size of Agen, ovoid, compressed; dark purple; bloom heavy; flesh yellow, rich, sweet; freestone; hangs well to the tree, and ripens its crop all together." (Plums of New York.)

Sugar.—A seedling of the Agen plum originating with Luther Burbank, Santa Rosa, Calif. "Fruit intermediate in time and length of ripening season; small, ovate or oval, halves equal; cavity shallow, narrow, abrupt; suture

shallow, often a line; apex roundish or pointed; colour dark reddish-purple changing to purplish-black, covered with thick bloom; dots numerous, small, light russet, inconspicuous; stem slender, long, pubescent, adhering; skin thin, tender, separating readily; flesh golden yellow, juicy, coarse, fibrous, tender, sweet, mild, good to very good; stone light coloured, with a tinge of red, thin, of medium size, ovate, flattened, with rough and pitted surfaces, blunt at the base, acute at the apex; ventral suture rather narrow, distinctly furrowed, slightly winged; dorsal suture with a wide, deep groove." (Plums of New York.)

Tree a vigorous, spreading grower and productive where it succeeds well. It is used quite extensively in prune making in the Pacific States, and has been planted to a limited extent in British Columbia.

Ungarish.—Fruit above medium to large; long oval; cavity narrow, shallow, abrupt; suture distinct, very slightly if at all depressed; apex round; colour dark purple; dots moderately numerous, indistinct, brown; bloom moderate, blue; skin fairly thick, tender; flesh greenish yellow, firm, fairly juicy; stone large, long, oval free; moderately sweet; quality above medium. Season middle of September. Introduced by Prof. Budd from C. H. Wagner, Riga, Russia.

This plum is somewhat like the Raynes (Dunlop 53). A prune plum. Promising on account of hardiness.

Washington.—Fruit large, roundish, slightly flattened at ends; colour greenish yellow with a pink blush on sunny side; dots obscure; cavity narrow, shallow; stem short, stout; suture distinct and slightly depressed; skin tough; flesh greenish yellow, firm, juicy, sweet, rich; stone medium size, roundish, almost or quite free; quality very good. Season early to mid-September. Tree a strong grower with a roundish top.

Yellow Egg.—Fruit large to very large, oval; colour deep yellow; bloom white; dots small, numerous, indistinct; cavity shallow, ridged; stem long, moderately stout, suture distinct, slightly depressed; skin thick, rather tough; flesh yellow, juicy, sweet; stone large, oval, cling; quality good. Season end of August to early September. Tree vigorous and productive.

JAPANESE VARIETIES

Abundance.—Fruit large, roundish; bright to deep red with a yellow ground; dots numerous, yellow, prominent; cavity narrow, abrupt; stem medium length, rather stout; suture distinct; apex pointed; skin thin, moderately tender; flesh yellow, juicy, firm, sweet, rich; stone oval, cling. Quality good to very good. Season August 10 to 25. Tree a strong upright grower, an early bearer and productive.

Burbank.—Fruit large to very large, roundish; colour deep red with dark red on sunny side and about cavity, on a yellow ground; dots numerous, small, distinct; yellow; stem medium length; suture merely a distinct line; apex sometimes pointed; skin thin, moderately tender; flesh yellow, firm, juicy, sweet, good flavour; stone roundish, cling; quality good. Season latter part of August, a few days after Abundance. Tree an exceptionally vigorous grower, very branching, and bears early and heavily. One of the most, if not the most, satisfactory of the Japanese plums. The flower buds appear hardier than most European varieties.

Chabot.—Fruit medium to large, roundish, heart-shaped; colour deep, rather dull red; dots numerous, small, yellow; cavity narrow; stem short, stout; suture fairly distinct; apex usually rounded; skin moderately thick, tough; flesh yellow, juicy, firm, sweet; stone below medium size, oval, cling; quality

good. Season late. Tree a strong upright grower and bears well. This variety is one of the later introductions and has proven one of the best of the Japanese plums.

Oyama (seedling of Red June).—Form roundish to broad oval; size medium; cavity narrow, medium depth, abrupt; suture a distinct line, not depressed; apex rounded; colour deep red all over; dots obscure; bloom thin, pale bluish; skin moderately thick, moderately tender, bitter; flesh yellow, firm, juicy; stone small, oval, cling; sweet, not of rich flavour; quality, medium to above medium. May be useful on account of hardiness of fruit buds. Triflora group. Originated at the Central Experimental Farm, Ottawa, Ont.

Red June.—Fruit medium to below in size, roundish, somewhat flattened; colour deep to dark red; dots small, yellow, numerous; cavity deep; stem short, moderately stout; suture distinct but shallow; skin thin, tender; flesh pale yellow, firm, juicy, briskly sub-acid with little richness; stone small, roundish, cling; quality medium. Season last week of July to first week of August. Tree moderately spreading. A medium bearer. This plum is valuable on account of its extreme earliness. This variety was received at the Central Experimental Farm under the name of Botan and Shiro-smomo. The flower buds are hardier than most European varieties, but although there is usually much bloom comparatively little fruit sets, probably because blossoms are self-sterile.

Togo (seedling of Red June).—Form roundish, somewhat heart-shaped; size above medium; cavity narrow, medium depth, abrupt; suture an indistinct, sometimes distinct, line, no depression; apex slightly flattened; colour deep red; dots numerous, small, indistinct; bloom moderate, bluish; skin moderately thick, tough; flesh yellow, firm, juicy; stone medium size, oval, slightly flattened, cling; sweet, acid next skin; quality good. A promising plum. Larger than Red June and better in quality. Handsome. Named Togo August 31, 1904, in honour of Admiral Togo. Triflora group. Originated at the Central Experimental Farm, Ottawa, Ont.

Willard.—Fruit above medium in size, roundish, flattened at ends; cavity very deep, open; suture deep, distinct; apex flattened; colour deep red and red; bloom thin; skin moderately thin, moderately tender; flesh pale greenish yellow; flavour sweet, but not rich; skin acid, bitter; stone small, oval, semi-cling; quality medium to above medium. Season August. An early variety. Introduced from Japan by Luther Burbank.

AMERICANA VARIETIES

Alma (Caro seedling).—Oval; large $1\frac{3}{4}$ x $1\frac{1}{2}$ ins.; cavity narrow, abrupt, medium depth; stem slender, medium length, $\frac{1}{2}$ in.; suture a distinct line, not depressed; apex rounded; yellow, thinly washed nearly all over with bright red; dots few, small yellow; bloom thin, bluish; skin thick, tough; flesh yellow, juicy; stone above medium size, oval, flattened, cling; flavour sweet, rich, but skin slightly astringent and acid; quality good. Americana group. A handsome plum.

American Eagle.—Fruit above medium size, roundish; cavity narrow, medium depth; suture a fairly distinct line; apex rounded; colour deep purplish red; dots numerous, small, yellow; bloom moderate, pale blue; skin thick and tough; flesh deep yellow, juicy; stone medium size, oval, slightly flattened, cling; sweet, rich flavour; quality good. Season mid-September. Would be more promising if colour were brighter.

Assiniboine (seedling of Wild Plum of Manitoba, originating at the South Dakota Experimental Station).—An early, large fruited variety. Fruited and ripened at Indian Head, Sask., since 1912.

Bender.—“Fruit large, oval, slightly compressed; colour dark red; dots, very many, dull yellow; bloom thick, blue; cavity shallow; suture obsolete; skin thick, tough; flesh yellow; stone large, oval, flat, quite free; quality good; season rather early; tree very vigorous, with very large, fine healthy foliage; very productive.” (Waugh.)

Planted at the Central Experimental Farm in 1900. Has been highly praised by some growers.



Plum trees in bloom at the Dominion Experimental Station at Morden, Manitoba.

Bixby.—Fruit above medium to large, roundish; cavity narrow, medium depth; suture rather indistinct, slightly depressed; apex rounded; colour yellow, more or less covered with bright red; dots numerous, small, yellow; bloom fairly heavy; skin moderately thick, rather tender; flesh deep yellow, juicy; stone medium size, oval in outline, considerably flattened, cling; sweet but not rich in flavour, no astringency; quality good; season late August to early September.

A very handsome, early plum. Chief fault is unevenness of ripening. Makes good preserves.

Bomberger.—Form roundish to broad oval; size very large; cavity shallow, narrow; suture a distinct line; apex rounded; colour yellow, more or less covered with deep lively red; dots few, small, yellow, distinct; bloom medium; skin thick, tough; flesh deep yellow, juicy; stone medium size, oval, flat; sweet and rich; quality very good. A very handsome plum. More attractive than *Hawkeye*. Promising. Americana group.

Bouncer.—Fruit very large to large, roundish, somewhat heart-shaped; cavity medium width, shallow; suture a distinct line; apex pointed; colour uniformly deep, purplish red all over; dots numerous, yellow, distinct; bloom

moderate; skin thick, tough; flesh deep yellow, juicy; stone large, flat, oval, cling; sweet, rich, very good flavour; quality very good; season mid to late September.

A seedling of Yosemite Purple, originated at the Central Experimental Farm, Ottawa, Ont.

A rather late variety.

Brackett.—Form roundish, flattened at ends; large to very large; cavity medium width, shallow; stem $\frac{1}{2}$ inch, slender; suture a distinct line, no depression; apex flattened, indented; colour yellow almost entirely overspread with deep purplish red; dots numerous, yellow, distinct; bloom moderate, bluish; skin thick, tough; flesh deep yellow, meaty, juicy; stone above medium, roundish, flattened, cling; sweet, rich, good flavour; quality good.

Of the same character as Oren and Bouncer, but is better than either of them.

Bryan (W. J.).—Fruit large, oval to heart-shaped; cavity medium width, medium depth, abrupt; suture a distinct line, very slightly depressed; apex rounded; colour yellow, thinly washed with red; predominant colour yellow; dots obscure; bloom thin, pinkish; skin thick, moderately tender; flesh yellow, juicy; flavour sweet, rich, pleasant; stone medium size, oval, cling; quality good. Season mid to late September. A handsome plum. Originated with H. A. Terry, Crescent, Iowa, fruiting first in 1896.

Caro.—Fruit large, roundish; cavity narrow, medium depth; suture fairly distinct; colour bright red, showing yellow in patches; dots numerous, yellow, distinct; bloom light; skin thick, moderately tender; flesh deep yellow, juicy; stone large, outline oval, considerably flattened; sweet, rich, good flavour; quality good; season early to mid-September.

A seedling of Wolf, originated at the Central Experimental Farm.

A promising seedling. More attractive than Wolf and better in quality.

City.—Fruit above medium size, roundish, somewhat heart-shaped; cavity medium width, deeper than most; suture a distinct line, slightly compressed; colour yellow, almost covered with deep red; dots numerous, small, yellow, distinct; bloom moderate; skin thick, moderately tender, slightly astringent; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, semi-cling; quality good. Season mid-September. Among the good kinds, but quite a number are better.

Comfort.—Fruit medium size, roundish; cavity narrow, shallow; suture merely a distinct line; apex rounded; colour uniformly deep red all over; dots indistinct; bloom moderate; skin very thick, tough; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, cling; sweet, good flavour; quality good. Season mid-September to October. A firm plum, but not large enough to be one of the best. Keeps better than most.

Consul.—Form large, roundish; cavity narrow, medium depth; suture a distinct line; apex rounded; colour deep red; dots moderately numerous, yellow, distinct; bloom light; skin rather thick, tough; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, almost free; quality good. Season late September to early October. A seedling of Wolf originated at the Central Experimental Farm, Ottawa, Ont. Will probably prove a useful late plum.

Corona (Caro seedling).—Large; oval, lopsided; cavity medium size, shallow; suture slightly depressed, lopsided; apex knobbed, irregular; greenish-yellow overspread with bright red; predominant colour red; dots indistinct; bloom moderate; skin thick, tough, slightly bitter; flesh yellow to greenish yellow, firm, juicy, meaty, sweet, sprightly flavour; quality good; stone large,

flattened, cling. Season late September. Originated at the Central Experimental Farm, Ottawa, Ont.

A very promising plum, large, of attractive appearance, of firm texture. Should prove to be a good shipper.

Cottrell.—Fruit above medium to large, oblong and roundish to heart-shaped; cavity narrow, medium depth; suture a distinct line; apex rounded; colour yellow, almost covered with bright red; dots rather numerous, small, yellow; bloom medium; skin moderately thick, tender; flesh pale yellow, juicy; stone medium size, oval, much flattened, cling; sweet, good flavour; quality good. Season early to mid-September. Promising, makes a good preserving plum and is attractive-looking.

One of the most promising seedling plums that fruited of those originated at Ottawa is a seedling of the *Caro*, which is a seedling of the *Wolf*; a description of this follows:—

Dara (*Caro* seedling).—Roundish to oval; large; cavity open, medium depth; suture a distinct line, very slightly depressed; apex rounded; colour, yellow, mottled and thinly washed with red; dots obscure; skin thick, moderately tender; flesh yellow, juicy; stone medium size, oval, almost free; sweet, pleasant flavour, skin acid; good quality. A good late plum. Originated at the Central Experimental Farm, Ottawa, Ont.

De Soto.—Fruit medium to above medium in size, roundish, somewhat heart-shaped, slightly flattened; cavity narrow, medium depth; suture a distinct line; colour deep yellow, well washed with deep red or dark red; dots obscure; bloom slight; skin moderately thick, fairly tender; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, cling; sweet, good flavour; quality good. Season mid to late September. A good plum on account of its quality and great productiveness, but is not as large as it should be to be one of the best.

Don.—Fruit large, roundish; cavity narrow, medium depth; suture a distinct line; colour uniformly deep, lively red all over; dots numerous, small, distinct; bloom moderate; skin thick, tough; flesh deep yellow, juicy, firm; stone medium size, oval, somewhat flattened, cling; sweet, rich, good flavour; quality very good. Season late September to October. A seedling of *Wolf*, originated at the Central Experimental Farm, Ottawa, Ont. A very promising plum. One of the best late plums fruited here.

Dr. Dennis.—Fruit above medium to large, somewhat heart-shaped flattened; cavity narrow, medium depth; suture a distinct line; apex rounded; colour deep red; dots small, numerous, distinct; bloom moderate; skin thick, rather tough; flesh deep yellow, juicy; stone large, flat, broad, cling; moderately sweet, slightly astringent; quality above medium. Season mid to late September. A good variety but not as promising as some.

Ekaro.—Fruit large, $1\frac{7}{8}$ inches by $1\frac{3}{4}$ inches, oval, somewhat lopsided; cavity deep, medium width, abrupt; stem medium length, $\frac{5}{8}$ inch, moderately stout; suture indistinct line, slightly depressed; apex flattened or slightly depressed; colour yellow washed with deep lively red; predominant colour deep lively red; bloom moderate, lilac coloured; dots numerous, yellow, distinct; skin thick, moderately tough; flesh deep yellow, juicy; flavour sweet, rich; quality good; stone large, oval, flattened, cling; season mid to late September. Originated at the Central Experimental Farm, Ottawa, Ont. A handsome plum of large size and of good quality.

Firmana (*Consul* seedling).—Large; oval, wedge, slightly lopsided; cavity medium to large, medium depth, suture indistinct; apex flattened; yellow, mottled and washed with carmine-red; predominant colour carmine-red; dots

few, medium size, around apex; bloom moderate; skin medium thick; flesh yellow, firm, somewhat dry, sweet to insipid flavour; quality medium; stone large, bean-shaped, flattened, free; season late September. Originated at the Central Experimental Farm, Ottawa, Ont.

A plum possessing pre-eminently the characteristics of a good shipping fruit. Ten fruits weighed ten ounces.

Fitzroy (Rollingstone seedling).—Form roundish, slightly heart-shaped, flattened; size above medium to large; cavity narrow, shallow, abrupt; suture a distinct line, no depression; apex rounded; colour yellow, well washed with deep red; dots numerous, small, yellow, distinct; bloom moderate; skin thick, moderately tender; flesh rather pale, yellow, juicy; stone above medium size, flattened, roundish to oval, practically free; sweet; quality good. A good plum, but cracks some, which may be against it. Freeness of stone a good point. Americana group. Originated at the Central Experimental Farm, Ottawa, Ont.

Forest Garden.—Fruit medium size, roundish; cavity narrow, medium depth; suture a distinct line; apex rounded; colour yellow, almost entirely covered with dark purplish red; dots small, numerous, yellow; bloom moderate; skin thick, tough; flesh deep yellow, juicy, sweet; stone medium size to small, oval, considerably flattened, cling; quality good. Season early to mid September. Plum not attractive enough to be promising.

Gaylord.—Fruit above medium to large, roundish, somewhat heart-shaped; cavity narrow, shallow; suture a distinct line, very slightly depressed; apex pointed; colour deep, dull red on yellow ground; dots obscure; bloom moderate; skin thick, rather tough, slightly astringent; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, semi-cling; sweet, good flavour; quality good. Season mid-September. Would be promising if colour were more attractive.

Gloria (Wolf seedling).—Form oval to oblong, somewhat flattened; size large; cavity narrow, shallow, abrupt; suture a distinct line; apex rounded; colour uniformly bright red all over, or yellow mottled with red; dots few, yellow, small, distinct; bloom thin, bluish; skin thick, tough; flesh deep yellow, juicy; stone large, almost or quite free, oblong, considerably flattened; sweet; quality good. Owing to its large size and the almost freeness of stone, this is a promising variety. Americana group. Originated at the Central Experimental Farm, Ottawa, Ont.

Hammer.—Fruit large, roundish to oval; cavity narrow, medium depth; suture a line, rather indistinct; colour uniformly deep red all over; dots numerous, yellow, distinct, prominent; bloom heavy; skin thick and tough; flesh deep yellow, juicy, meaty, sweet; stone below medium size, oval, considerably flattened, cling; quality good. Season late September. A very handsome plum having more the flavour of Miner than Americana. This variety cracks badly on the trees, otherwise it would be one of the most promising.

Hawkeye.—Fruit large, roundish; cavity shallow, narrow; suture merely a distinct line; apex rounded; colour yellow, more or less covered with purplish red; dots, small, indistinct; bloom medium; skin thick, moderately tough; flesh deep yellow, juicy; stone large, broad, much flattened, cling; sweet, good flavour. Quality good. Season mid to late September. One of the best.

Hazel (Gloria seedling).—Large; rounded ovate; cavity shallow, medium; suture indistinct, fairly clearly lined; apex rounded; yellow, generally entirely overspread with a dull, rich red; predominant colour dull, rich red; dots medium to large, distinct, yellow; bloom moderate; skin thick, tough, but agreeable; flesh golden yellow, juicy, moderately firm; sweet flavour; good quality; stone

large, elongated ovate, flattened. Season mid-September. Originated at the Central Experimental Farm, Ottawa, Ont.

A very attractive plum of considerable promise.

Jewel.—Fruit large, roundish; cavity shallow, medium width; suture a distinct line, not depressed; apex rounded; colour yellow, almost covered with deep red; dots indistinct; bloom medium, pinkish blue; skin thick, tough; flesh deep yellow, juicy, moderately firm; flavour sweet, good; stone medium size, oval, cling; quality good. Season mid to late September. A good plum.

Joseph (seedling from Joseph Rowley, Sr., Cummings Bridge, Ont.).—Form oval, flattened; very large; cavity shallow, medium width; suture a distinct line, not depressed; apex rounded, almost pointed; yellow more or less washed and mottled with attractive red; dots numerous, yellow, distinct; bloom medium; skin moderately thick, moderately tender; flesh yellow, juicy; stone above medium size, oval, almost free; flavour sweet, rich, good; quality very good for an americana plum.

An American plum of the largest size. Attractive in appearance and one of the best in quality. Very promising.

Came up in Mr. Rowley's garden in 1904. Bore in 1907 one plum. In 1908 two dozen plums. Measures $1\frac{1}{2}$ inches around base 1908. No American plum trees near, but may have grown from a pit of American plum. September 24, 1908.

Kieth.—Form oval, somewhat heart-shaped; size above medium to large; cavity narrow, shallow; suture a distinct line, not depressed; apex rounded, almost pointed; colour yellow almost entirely covered with deep red; dots obscure; bloom light, lilac; skin thick, tough; flesh deep yellow, juicy; stone medium size, roundish, cling; flavour sweet, rich; quality good. Not as good as some others.

Kilmore (Yosemite Purple seedling).—Size large; form roundish, slightly flattened; cavity medium depth and width; suture a distinct line; colour bright purplish red; dots moderately numerous, yellow, distinct; bloom moderate; skin moderately thick, moderately tough; flesh deep yellow, juicy; stone above medium, oval, considerably flattened, almost free; sweet, rich, good flavour; quality good. Promising. Season medium late. Originated at the Central Experimental Farm, Ottawa, Ont.

Legal Tender.—Fruit above medium in size, roundish, flattened at ends; cavity medium depth and width, flaring; suture deep and prominent; apex depressed; colour yellow, well washed with deep rather dull red; dots indistinct; bloom very slight or none; skin moderately thick, tough; flesh yellow, moderately firm, juicy; flavour sweet, acid next skin; stone above medium, oval, flattened, cling; quality above medium. Season early September. Originated with H. A. Terry, Crescent, Iowa, in 1896.

Lester (De Soto seedling).—Roundish, one side a little longer than other; medium to above medium in size; cavity narrow, shallow; suture a distinct line only; apex rounded; yellow more or less covered with bright red; dots moderately numerous, small, yellow, rather indistinct; bloom moderate, bluish; skin moderately thick, rather tough; flesh deep yellow, juicy; stone below medium size, semi-cling, roundish, considerably flattened; sweet, good flavour; quality good. Season mid-September. Worth keeping on account of quality and productiveness. A promising plum. Originated at the Central Experimental Farm, Ottawa, Ont.

Lottie.—Form roundish; size large; cavity shallow, narrow; suture an indistinct line; apex slightly flattened; colour yellow, mottled and washed with red; dots obscure; bloom slight; skin thick, tough; flesh sweet, juicy; stone

medium size, roundish, semi-cling; sweet, rich; quality good. A handsome plum of good quality.

Major.—Seedling of Wild Plum of Manitoba, originated by M. Major, Winnipeg, Man. A very early variety of good quality, though rather small in size.

Mankato.—Fruit above medium to large, roundish; cavity narrow, medium depth; suture a distinct line; apex rounded; colour deep, dull red with a moderately heavy bloom; dots numerous, small, yellow; bloom rather heavy; skin thick, tough; flesh deep yellow, juicy, sweet, good flavour, not astringent; stone large, flat, semi-cling; quality good. Season late August to early September. Better in quality than Bixby, but not as handsome. A good early plum. Promising.

Marler (Caro seedling).—Roundish to oval; large for American, $1\frac{1}{2} \times 1\frac{1}{2}$ ins.; cavity shallow, medium width; stem medium length, moderately stout; suture a distinct line, not depressed; stem more persistent than with most varieties; apex slightly depressed; yellow, covered with bright crimson; dots numerous, yellow, conspicuous; bloom pinkish; skin thick, but moderately tender; flesh yellow, firm, juicy; stone medium size, oval, cling; flavour sweet, rich, good, acid next skin; quality good. Americana group. Originated at the Central Experimental Farm, Ottawa, Ont.

A handsome plum, and on account of firmness and good quality should be useful. Hangs on tree well.

Milton.—Fruit medium to large, oval, bright to rather deep red; dots numerous, small, yellow, prominent; suture merely a distinct line; skin thin but tough; flesh yellow, juicy, sweet; stone medium size, cling; quality medium to good. Season last week of August. Tree a strong grower and very productive where fruit buds are not injured by winter. Wildgoose group.

New Ulm.—Fruit large, roundish, pointed or somewhat heart-shaped; cavity narrow, shallow; suture merely a distinct line; apex rounded, almost pointed; colour yellow, more or less covered with bright purplish red; dots numerous, small, yellow; bloom moderate; skin thick, tough; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, cling; quality good. Season early to mid September. A firm plum, and should make a good shipper. Too thick and tough in the skin for home use.

Ocheeda.—Fruit medium to above medium size, roundish to heart-shaped; cavity narrow, shallow; suture a distinct line; apex almost pointed; colour, deep red all over; dots numerous, small, yellow; bloom rather heavy; skin thick, moderately tender; flesh deep yellow, juicy; stone medium size, roundish, considerably flattened, cling; sweet, good flavour; quality good. Season early to mid-September. A firm plum and should ship well.

Patten XXX.—Fruit medium to large, somewhat heart-shaped, sides uneven; cavity open, flaring, deep; stem slender; suture a distinct line, depressed; apex roundish; colour, yellow, washed and mottled with deep red; predominant colour deep red; dots obscure; bloom thin, bluish pink; skin thick, moderately tough; flesh yellow, juicy; flavour sweet; stone medium size, oval flattened, cling; quality good. Season mid-September. Flesh clings too closely to stone to be very desirable. Originated with C. G. Patten, Charles City, Iowa.

Queen (Golden Queen).—Fruit, very large, roundish, oblong, bright golden yellow and of the most delicious flavour; quite unexcelled for canning, and very fine for eating out of hand or for slicing and serving with sugar and cream, as for peaches. Ripens latter part of August to September 10. Tree is remarkable for its unusually fine, upright growth. (Introducer's description). Originated with H. A. Terry, Crescent, Ia. Has given good satisfaction elsewhere.

Schley (Admiral).—Form roundish; size very large; cavity narrow, shallow; suture a distinct line; apex rounded; colour yellow, well washed with deep bronzy red; dots numerous, small, yellow, distinct; bloom thin, bluish; skin moderately thick, tough; flesh deep yellow, juicy; stone large, oval, flat, cling; sweet, of a rich flavour; quality very good. One of the best Americana plums yet tested. An improvement over Hawkeye. Americana group.

Silas Wilson.—Fruit large, roundish; cavity narrow, shallow; suture an indistinct line; apex rounded; colour yellow, more or less mottled with purplish red; dots very small, yellow, sparse; bloom medium; skin rather thick, moderately tender; flesh deep yellow, juicy; stone medium to above, roundish, broad, considerably flattened, semi-cling; sweet, rich, good flavour; quality very good. Season mid to late September. One of the best Americana plums.

Smith.—Form roundish to broad oval; size large; cavity narrow, shallow; suture a distinct line; apex rounded; colour yellow, mottled and washed with red; dots obscure; bloom light; skin thick, moderately tough; flesh yellow, juicy; stone rather large, oval, nearly free; sweet, rich; quality good to very good. A good plum. Promising. Americana group.

Stoddard.—Fruit large to very large, roundish; cavity narrow, shallow; suture a distinct line; apex rounded; colour deep yellow, almost entirely covered with deep purplish red; dots fairly numerous, small, yellow; bloom light; skin thick, tough, slightly astringent; flesh deep yellow, juicy; stone medium size, broad, flat, cling; sweet, good rich flavour; quality very good. Season late September. One of the largest and best flavoured Americana plums.

Sunrise.—Fruit large, oval; cavity narrow, shallow; suture a distinct line, not depressed; apex rounded; colour yellow, more or less covered with bright red; dots few, yellow, distinct; bloom medium, skin thick, moderately tough; flesh deep yellow, juicy, sweet; stone large, flat, oval; practically free; quality good. Season mid-September. A seedling of De Soto, originated at Central Experimental Farm, Ottawa, Ont. Promising owing to freeness of stone.

Swift (De Soto seedling).—Form broad oval, much flattened; size large, cavity narrow, shallow; suture merely an indistinct line; apex slightly flattened; colour, yellow, mottled and washed with deep red; dots obscure; bloom slight; skin thick, moderately tough; flesh rather pale yellow, juicy; stone above medium, oval, semi-cling, almost free; flavour sweet, pleasant. A good plum and worth propagating. Americana group. Originated at the Central Experimental Farm, Ottawa, Ont.

Terry (Free Silver).—Fruit large, regular, oval; surface smooth but not shiny; colour a clear dark red; dots small, grey; bloom thin, lilac; cavity small, shallow; stem, $\frac{3}{8}$ to $\frac{1}{2}$ inch; suture indistinct; apex rounded; skin thin, tough, acid but not astringent; flesh firm but melting; stone large, ovate, pointed; flattened, acid next to stone, adherent; flavour a mingling of Americana and Angustifolia; quality good. Season end of August. One of the largest and handsomest native plums yet produced. A very promising plum. (Craig.) Planted at Central Experimental Farm in 1902.

U.S..—Form roundish; large; cavity shallow, medium width; suture a distinct line; apex rounded; yellow almost entirely covered with deep purplish red; dots numerous, yellow, distinct; bloom moderate, bluish; skin thick, tough; flesh yellow, juicy; stone medium size, oval, cling; sweet, good flavour; quality good.

Of the same type as Oren and Bouncer, but not as good as either.

Van Buren.—Fruit medium to above medium size, almost round; cavity narrow shallow; suture only a fairly distinct line; apex rounded; colour yellow, more or less mottled and washed with bright red; dots numerous, small, yellow; bloom light; skin thick, tough; flesh deep yellow, juicy, firm; stone above

medium size, roundish, broad, much flattened, cling; sweet, good flavour; quality good. Season mid-September to October.

A handsome plum. One of the latest and best keepers.

Vesta (Gloria seedling.)—Large to very large; oval; cavity medium to large, shallow; suture slightly depressed, fairly clearly lined; apex swollen opposite suture; yellow overspread by bright pink to dark, carmine red; predominant colour light, carmine red; dots medium to large, distinct, yellowish; bloom moderate; skin thick, slightly bitter; flesh yellow, juicy, firm, meaty; sweet, distinctive flavour; good quality; stone large, flattened, oval, nearly free. Season late September. Originated at the Central Experimental Farm, Ottawa, Ont.

One of the best. Ten fruits weighed 12 ounces. Attractive, large, firm, of good quality; skin somewhat tough.



Americana plum—(*Prunus americana*)

Warren.—Fruit above medium in size, roundish; cavity shallow to medium depth, medium width; suture a distinct line, not depressed; apex rounded or very slightly depressed; colour yellow, almost covered with dark red; pre-

dominant colour dark red; dots numerous, yellow, distinct; bloom heavy, bluish pink; skin thick, tough; flesh greenish yellow, juicy, moderately firm; flavour sweet, good; stone large, broad, oval, flattened, cling; quality good. Season mid to late September. Not quite attractive enough in appearance. Originated with H. A. Terry, Crescent City, Iowa, fruiting first in 1897.

Weaver.—Fruit above medium size, roundish, somewhat heart-shaped; cavity narrow, medium depth; suture a distinct line; colour yellow, nearly entirely overspread with bright red; dots numerous, small, purple; bloom light; skin moderately thick, tough; flesh deep yellow, juicy, sweet; stone medium size, oval, considerably flattened, almost free; quality good. Season mid-September.

An attractive plum, but not large enough to be promising.

Welcome (seedling of *De Soto*).—Fruit above medium size, oval, flattened considerably; cavity narrow, shallow; colour rich yellow more or less washed with red; dots very small, yellow, indistinct; bloom thin; skin moderately thick, fairly tough; flesh yellow, juicy, sweet, a pleasant but not rich flavour; quality good; season mid-September. A very handsome plum. Tree vigorous and productive. Originated at the Central Experimental Farm, Ottawa, Ont.

Whitaker.—Fruit large, oval, somewhat heart-shaped; colour bright red; suture merely a distinct line; dots numerous, yellow prominent; bloom thin, bluish; skin thin, tough; flesh yellow, juicy, moderately firm, sweet, good flavour; stone medium size, long oval, cling; quality good. Season first and second weeks in September, does not ripen evenly. A handsome plum. Tree vigorous, spreading and productive where fruit buds are not injured by winter. Wild-goose group.

Wolf.—Fruit large, roundish; cavity narrow, shallow; suture shallow, fairly distinct, not depressed; apex rounded; colour deep red; dots fairly numerous, small, yellow, distinct; bloom moderate; skin thick, tough; flesh deep yellow, juicy, sweet, rich, good flavour, stone above medium size, outline oval, considerably flattened, cling; quality good. Season early to mid-September. One of the best. This does not answer the description of *Wolf* given by some authorities. Both, however, are good plums.

Wyant.—Fruit large, oblong, flattened; cavity narrow, deep; suture a distinct line; apex almost pointed; colour deep red; dots numerous, small purple; bloom medium; skin rather thick, somewhat tough, astringent; flesh deep yellow, moderately juicy, fairly sweet; stone large, much flattened, oval, semi-cling, almost free; quality medium. Season mid-September. Quality not good enough. This plum is highly recommended in the Western States, but has not proven as good as some others here.

Yosemite Purple.—Fruit large, roundish, somewhat flattened; cavity medium depth and width; suture an indistinct line; colour deep, dull purplish red; dots numerous, small, yellow, distinct; bloom moderate; skin thick, but tender; flesh deep yellow, juicy; stone medium size, oval, considerably flattened, semi-cling; sweet, rich flavour, but somewhat astringent; quality above medium. Season mid to late September.

Yuteca (seedling of *P. Americana*).—Originated by N. E. Hansen, Brookings, S.D.

Tree hardy and a strong grower. Fruit roundish, large; cavity medium width, shallow; stem long, slender; suture an indistinct line, not depressed; apex rounded; yellow, almost covered with lively crimson; dots numerous, yellow, distinct; bloom moderate, bluish; skin thick, moderately tough; flesh yellow, firm, juicy; stone medium size, roundish, semi-cling; flavour sweet, rich; quality good. *Americana* group.

An attractive-looking plum of good quality. Rather promising.

NIGRA VARIETIES

Atkin.—Fruit large, oval; cavity narrow, medium depth, suture obscure; apex pointed; colour uniformly deep red all over; dots none; bloom none; skin thin; flesh deep yellow, juicy, moderately sweet, not rich or high flavoured; stone large, flat, oval, semi-cling, no astringency; quality medium to above. Season, last week of August. Tree only fairly productive. Nigra group. The earliness of this plum is the principal point for recommendation.

Cheney.—Fruit large, round to somewhat oval, uneven; cavity narrow, medium depth; suture merely an indistinct line; apex rounded; colour uniformly deep red all over, sometimes paler on one side; dots none; bloom none; skin moderately thick, tough, not astringent; flesh deep yellow, juicy; stone medium size, flat, oval, cling; sweet, moderately rich flavour; quality good. Season late August to early September. One of the best. It soon gets soft, however, after ripening. Tree a strong grower, moderately productive. Nigra group.

Mammoth.—This is a seedling of *Cheney*, originated by A. P. Stevenson, Morden, Man. From its appearance one should be inclined to believe that it was pollinized with the native *P. americana*, but as it has many characteristics of *P. nigra*, it is included in that group.

Fruit above medium to large, roundish to oval; colour lively red; dots numerous, distinct; bloom heavy; skin moderately thick to rather thin; flesh yellow, juicy; sweet and of good flavour. Quality good. Season mid to late August.

Carstesen.—Fruit medium size, roundish, somewhat uneven; cavity narrow, medium depth; suture obscure; apex rounded; colour yellow, nearly covered with deep red; dots obscure; bloom none; skin thin, tender; flesh yellow, juicy, sweet, good flavour; stone flat, roundish, semi-cling, almost free; quality good; season early to mid-August. Tree vigorous, productive. The earliest native plum tested, and valuable on this account. A Nigra seedling, originated by H. P. Carstesen, Billings Bridge, Ont. (near Ottawa).

Ottawa (*Carstesen* seedling).—Fruit above medium to large; form oval; cavity medium depth and width; stem short, moderately stout; suture a distinct line, slightly depressed; apex rounded; colour yellow, nearly entirely overspread with lively but deep red; predominant colour lively deep red; dots obscure or indistinct; bloom little or none; skin moderately thick, moderately tough; flesh yellow, juicy; flavour moderately sweet, no astringency; quality above medium; stone above medium, oval, flattened, cling; season mid-August. A handsome plum and should prove valuable because of earliness. Originated at the Central Experimental Farm, Ottawa, Ont.

Rhoda (*Cheney* seedling).—Large; oval (regular); cavity broad, moderately deep to shallow; suture slightly depressed, faintly lined; apex rounded; dark red; predominant colour dark red; dots small, numerous, indistinct; bloom none to slight; skin fairly thin, tough, peels when ripe; flesh rich orange-yellow, firm, juicy; sweet, rich, pleasant flavour; good quality; stone broadly oval, dark colour, semi-free. Season mid-September. A good plum. Originated at the Central Experimental Farm, Ottawa, Ont.

Rideau (*Carstesen* seedling).—Fruit medium to above medium; form oval; cavity narrow, shallow, abrupt; stem medium length, slender; suture indistinct, not depressed; apex rounded to slightly flattened; colour yellow, more or less mottled and thinly washed with bright red; predominant colour bright red; dots obscure; bloom none; skin thin, moderately tender; flesh yellow, juicy; flavour moderately sweet mixed with acid; quality above medium; stone above medium, roundish to oval, flattened, cling; season early August. A very early plum and in this lies its principal value. Originated at the Central Experimental Farm, Ottawa, Ont.

Troy (Cheney seedling).—Roundish, large; cavity narrow, shallow; suture a fairly distinct line very slightly depressed; apex rounded; yellowish, well washed with deep red; dots numerous, small, yellow, distinct; bloom moderate, bluish; skin rather thick, moderately tender; flesh deep yellow, juicy; stone above medium, oval, flattened; sweet, good flavour; quality good to very good. Season mid-September.

A promising seedling, better in quality than Cheney. Originated at the Central Experimental Farm, Ottawa, Ont.

HYBRID VARIETIES

America (*Prunus Munsoniana* x *P. triflora*).—Originated by Luther Burbank, Santa Rosa, Calif.

“Fruit early, season of medium length; one and three-eighths inches in diameter, roundish oval, halves equal; cavity shallow, flaring; suture shallow, a distinct line; apex roundish; colour clear, dark, currant-red over golden-yellow, mottled, with thin bloom; dots numerous, small, whitish, inconspicuous; stem slender, one-half inch long, glabrous, adhering to the fruit; skin thin, bitterish, separating readily from the pulp; flesh yellow, juicy, fibrous, somewhat tender, sweet, not high in flavour; fair in quality; stone clinging, seven-eighths inch by one-half inch in size, oval, pointed, with pitted surfaces, broadly ridged along the ventral suture; dorsal suture grooved.” (Plums of New York.)

Tree strong, spreading grower and very productive. Has been found comparatively free from rot in New York State. Would be hardy only in the warmest parts of Canada.

Champa (Sand Cherry Seedling, Hansen).—This is a large fruiting sand cherry of more upright growing habit than many, which is promising for the prairie provinces. The quality of the fruit is better than most sand cherries. While put among the hybrid plums here, it is considered by the originator to be a pure sand cherry.

Cheresoto (*Prunus Besseyi* x *De Soto*, Hansen).—Size medium to below, $1\frac{1}{4}$ inches by $1\frac{1}{8}$ inches; form oval, abruptly pointed; cavity deep, abrupt, moderately open; stem medium length, $\frac{3}{4}$ inch, slender; suture a distinct line, not depressed; apex abruptly pointed; colour greenish yellow almost or quite covered with dull red; predominant colour dull red; dots obscure; bloom practically none; skin moderately thick, tender; flesh pale greenish yellow, moderately juicy, soft; flavour sweet and acid, astringent; quality medium; stone small, long, oval, almost free; season late August or early September. Of no special value here; too poor in quality.

Climax (*Prunus triflora* x *Prunus Simonii*).—Originated by Luther Burbank, Santa Rosa, Calif.

“Fruit very early, season short; one and three-quarter inches in diameter, cordate or roundish slightly compressed, halves unequal; cavity deep, abrupt, regular, marked with faint, reddish, radiating streaks; suture deep, broad; apex pointed; colour dark red, mottled; bloom of medium thickness; dots numerous, variable in size, russet, conspicuous, clustered about the base; stem thick, nine-sixteenths inch long, glabrous, parting readily from the fruit; skin thick, bitter, with a tendency to crack, separating easily from the pulp only when fully ripe; flesh yellowish, very juicy, somewhat fibrous, tender and melting, sweet, pleasant flavour, aromatic; good; stone adhering, seven-eighths inch by five-eighths inch in size, somewhat long-oval, pointed, roughish, conspicuously winged and grooved on the ventral suture; dorsal suture slightly grooved.” (Plums of New York.)

A very handsome plum. It is succeeding well in Southwestern Ontario, but is not as productive as some others. The tree is a strong grower, but somewhat straggling in habit. Would be hardy only in the warmest parts of Canada.

Emerald (*P. triflora* x *P. americana*).—Fruit large, roundish; cavity medium width, deep, abrupt; stem medium length, slender; suture a distinct line, very slightly depressed or not at all; apex roundish; colour yellow, thinly to heavily washed and mottled with bright red; predominant colour sometimes yellow, sometimes red; dots numerous, small, yellowish, indistinct; bloom moderate, pinkish; skin moderately thick, moderately tough; flesh firm to moderately firm, juicy; flavour sweet, rich, good, though acid next skin; stone medium size, oval, slightly flattened, cling to semi-cling; quality good to very good. Season mid to late September. Originated by Theodore Williams, Benson, Nebraska. This has been wrongly named Omaha by at least one nursery. It is a cross between Brittlewood and Burbank.

Ezaptan (*Prunus Besseyi* x *Sultan, Hansen*).—Size small, one inch and less; form roundish; stem slender, rather long, one inch; colour purple; skin thin, moderately tough; flesh dark, juicy; flavour briskly subacid; quality above medium; season early September. Much of the character of the best sand cherries.

Hanska (*Prunus americana* x *P. Simonii, Hansen*).—Size medium, $1\frac{3}{8}$ by $1\frac{5}{8}$ inches; form oblate to roundish, flattened at ends; cavity open, deep, abrupt; suture a distinct line, depressed; apex depressed; colour deep purplish red; predominant colour deep purplish red; dots numerous, small, yellow, distinct; bloom heavy, bluish, skin moderately thick, moderately tough; flesh greenish yellow, moderately firm, juicy; flavour sweet, pleasant, with a suggestion of grape; quality good; stone medium size, roundish, cling; season evidently early to late September. One of the best in quality of Hansen's hybrid plums.

Inkpa (*Prunus americana* x *Prunus Simonii, Hansen*).—Globular, flattened; size medium, $1\frac{1}{6}$ x $1\frac{1}{4}$ ins.; cavity large, wide, fairly deep; suture distinct, depressed; apex slight, depressed; dark plum colour (i.e., dark crimson maroon); dots numerous, very distinct, whitish; bloom slight; skin thick, tough, but not astringent or bitter; flesh buff colour to whitish; stone small, cling; very rich, velvety, pear flavour, sweet and pleasant; quality good.

A very distinctive flavour which might be objected to by some people, otherwise a good plum for both dessert and culinary purposes.

Kaga (*Prunus americana* x *Prunus Simonii, Hansen*).—Somewhat heart-shaped, about size of Lombard or larger, $1\frac{1}{2}$ x $1\frac{3}{4}$ ins.; cavity deep, abrupt, medium width; suture a distinct line, very slightly depressed; apex rounded; yellow, entirely overspread with deep crimson; dots numerous, yellow, distinct; bloom bluish; skin thick, tough; flesh greenish yellow, firm, juicy; stone below medium size, roundish, cling; quality above medium to good; sweet subacid, acid next stone and skin, spicey, pearlike flavour.

An attractive-looking plum with many Japanese characteristics. It is highly perfumed. Appears hardier in flower bud than most European plums. Should make a good shipping plum.

Mancheno (*Cheney* x *Manitoba Plum*).—Oval; size $1\frac{3}{8}$ x $1\frac{1}{8}$ ins.; cavity narrow medium depth, abrupt; stem medium length, $\frac{1}{2}$ inch, slender; suture indistinct; apex rounded; yellow, almost entirely covered with deep red; dots obscure; skin moderately thick, moderately tough; flesh yellow, juicy; stone large, flat, cling; briskly subacid, somewhat astringent, little flavour; quality medium.

An attractive-looking plum, and earlier than Cheney. May be useful on this account. Cross by Dr. Wm. Saunders.

Maynard (*Prunus triflora* x *P. Simonii*).—Originated by Luther Burbank, Santa Rosa, Cal. This plum succeeds very well on the Lower Mainland of British Columbia where it has been planted to some extent. The fruit is large,

roundish-truncate, dark red, becoming almost black and covered with a heavy bloom. The flesh is reddish. It is sweet but sprightly or aromatic and is good in quality. The season is early. The tree is productive.

Omaha (*P. americana* x *P. triflora*).—Originated by Theodore Williams, Benson, Nebraska.

Tree hardy, a strong grower and productive. Fruit buds hardy. Fruit roundish, almost round; as large as largest *Americana*, $1\frac{1}{2}$ by $1\frac{1}{2}$ inches; cavity narrow, medium depth; stem short, $\frac{5}{8}$ inch, moderately stout; suture an indistinct line, little, if any, depressed; apex rounded; yellow, entirely or almost entirely covered with attractive red; dots numerous, small, distinct; bloom bluish; skin moderately thick, tough; flesh yellow, juicy, tender; stone medium size, oval, cling; flavour sweet, good except next stone and skin, where acid; quality good except next skin.

Appears to be a blend of *Americana* and *Japanese*. Fruit has perfume of *Japanese*. Foliage of tree somewhat like *Japanese*.

Opata (*Prunus Besseyi* x *Gold, Hansen*).—Size small, 1 by $1\frac{1}{4}$ inches; form roundish to oval, flattened about cavity; cavity deep, medium width; suture a distinct line, no depression; apex rounded; colour greenish yellow more or less covered with dark reddish purple; predominant colour reddish purple; dots obscure; bloom thin, bluish; skin moderately thick, tough; flesh moderately firm, juicy, yellowish green; flavour sweet and acid, astringent; quality medium; stone small, roundish, cling; season August. Much of the character of a sand cherry. Valuable in the Prairie Provinces.

Pembina (*Manitoba Wild* x *Red June*).—Originated by Prof. N. E. Hansen, Brookings, South Dakota. Fruit large; round-ovate with shallow suture; colour red; bloom heavy; skin moderately thick; flesh juicy but firm; pleasant flavour; quality good; season mid to late August.

Sansoto (*Prunus Besseyi* x *De Soto, Hansen*).—Size medium to below, $1\frac{1}{2}$ by $1\frac{1}{2}$ inches; form roundish to heart-shaped; cavity narrow, abrupt, deep; stem slender, short, $\frac{5}{8}$ inch long; suture an indistinct line, no depression; apex rounded; colour greenish yellow covered with dull to dark reddish purple; predominant colour dull reddish purple; dots small, yellow, distinct; bloom thin, bluish; skin thin, moderately tender; flesh soft to moderately firm, juicy, pale yellowish green, sweet and acid; little flavour; quality medium; stone medium size, oval semi-cling; season late August or early September. Not likely to be valuable in Eastern Canada. Not attractive enough in appearance or good enough in quality.

Sapa (*Prunus Besseyi* x *Sultan, Hansen*).—Roundish somewhat heart-shaped; size $1\frac{1}{8}$ x 1 in.; cavity open, deep, abrupt; stem slender, $\frac{3}{4}$ in. long; suture a distinct line; apex rounded or very slightly flattened; purple, washed with dark purple; dots numerous, very small, yellow, indistinct; bloom bluish, thin; skin thin, moderately tough; flesh dark purple, very juicy; stone medium size, oval, cling; flavour briskly subacid, sprightly, acid next skin, slightly astringent; quality above medium.

Tastes a good deal like the better sand cherries, but is larger. Valuable in the Prairie Provinces.

Shiro (*Prunus Simonii* x *P. triflora* x *P. cerasifera* x *P. Munsoniana*).—Originated by Luther Burbank, Santa Rosa, Calif., and said to have in it the blood of the Robinson, Myrobalan, Apricot and Wickson plums.

“Fruit very early, season short; one and one-half inches in diameter, roundish, conic, with halves equal; cavity intermediate in depth and width, flaring, regular; suture an indistinct line; apex roundish; colour light yellow becoming deeper yellow as the season advances, occasionally with a blush of

pink, with thin bloom; dots numerous, very minute, whitish, inconspicuous; stem three-eighths inch long, adhering to the fruit; skin thin, tough, sour, occasionally cracking, separating readily although a thin coating of flesh is left clinging to the skin; flesh light yellow, semi-transparent, the stone being faintly visible, very juicy, fibrous, somewhat melting, sweet, mild, lacks character in flavour; good; stone clinging, seven-eighths inch by five-eighths inch in size, broadly oval, flattened, slightly elongated at the base, with rough surfaces; ventral suture faintly ridged and furrowed; dorsal suture very slightly grooved." (Plums of New York.)

The tree is a strong grower of an upright, spreading habit and productive where it succeeds well, but it is too tender except for the warmest parts of Canada.

Toka (*Prunus americana* x *P. Simonii*, Hansen).—Fruit roundish to heart-shaped; below medium in size (1 x 1½ ins.); cavity narrow, medium depth, abrupt; stem medium length, slender; suture an indistinct line, very slightly depressed; apex rounded; colour yellow entirely covered with deep red; dots very small, indistinct; bloom thin, pinkish; skin moderately thick, tough; flesh yellow, juicy, moderately firm; stone medium size, oval, cling; sweet with a peculiar aromatic, pleasant flavour, acid next skin and pit. Quality good. Season mid-September. A decided and rather unusual flavour. Not large enough to be very promising unless very hardy.

Tokata (*P. Simonii* x *De Soto*, Hansen).—The Tokata plum has proven comparatively hardy in some parts of the prairie provinces, having done particularly well at the Forestry Station, Indian Head, Sask. It is a medium size plum of fair quality. Its season is rather late for some sections.

Tokeya (*Sand Cherry* x *Chinese Apricot*, Hansen).—Roundish, almost oblate, flattened at ends; size 1 x 1½ ins.; cavity deep, medium width; stem moderately stout, ½-inch long; suture an indistinct line, slightly depressed; apex flattened; dark red; dots indistinct; bloom thin, bluish; skin thin, moderately tender; flesh greenish, juicy; stone medium size, roundish, cling; acid, bitter flavour; quality below medium. Hybrid group.

Not at all agreeable to eat on account of bitterness.

Tom Thumb (Seedling of *Ezaptan*, Hansen).—This is a small cherry-like plum with dark skin and flesh. It is much like the Sapa in fruit, and was named by the originator "Tom Thumb Cherry." This variety is proving quite promising in the prairie provinces. It forms a low bush, bears very early, and can be treated as a bush fruit, such as the currant and gooseberry, and planted comparatively closely.

Waneta (*Apple Plum* x *Terry*, Hansen).—Size very large, 2 by 2 inches; form heart-shaped; cavity medium depth and width, slightly flaring; stem medium length, ¾-inch, moderately stout; suture indistinct, not depressed; apex rounded; colour yellow, nearly covered with dark red; predominant colour dark red; dots numerous, small, yellow, distinct; bloom thin, bluish, pink; skin moderately thick, tough; flesh deep yellow; flavour sweet, not very rich; quality good; stone medium size, oval, flattened, cling; season mid to late September. This is the largest Americana hybrid fruited here, but it is not so good in quality as the Emerald (Williams), which is nearly as large.

Wickson (*Prunus triflora* x *P. Simonii*).—Originated by Luther Burbank, Santa Rosa, Calif. He considered it a cross between Kelsey and Burbank, but it is thought by others to have the blood of *Prunus Simonii*.

"Fruit early mid-season, period of ripening long; variable in size, the larger fruits about two and one-eighth inches in diameter, obliquely cordate, halves unequal; cavity deep, abrupt, with yellowish concentric rings; suture often prominent and deep, with a prolonged tip at the apex; colour dark red over a

yellow ground, indistinctly splashed with darker red, mottled with thin bloom; dots numerous, small, yellow, inconspicuous, densely clustered about the apex; stem thick, eleven-sixteenths inch long, glabrous; skin thin, tender, separating



Waneta plum—Experimental Station, Morden, Manitoba.

easily; flesh amber-yellow, juicy, coarse, somewhat fibrous, firm, sweet, pleasant but not high in flavour; good; stone clinging, one inch by five-eighths in size, oval or ovate, pointed, with pitted surface; ventral suture winged; dorsal suture grooved." (Plums of New York.)

LIST OF VARIETIES TESTED AT CENTRAL EXPERIMENTAL FARM, OTTAWA

Names of Varieties and Date of Planting Oldest Trees		Names of Varieties and Date of Planting Oldest Trees—Continued	
EUROPEAN PLUMS		EUROPEAN PLUMS—Continued	
Abegweit	1905	<i>Moore's Arctic</i> —Arctic	1903
Amaryllis	1902	Mount Royal	1903
Arab	1898	Mountain	1903
Arctic (<i>Moore's Arctic</i>)	1899	Naples (<i>Beauty of Naples</i>)	1900
Baker Prune	1899	Niagara (<i>Bradshaw?</i>)	1898
<i>Beauty of Naples</i> —Naples		Outremont	1903
Benedict	1906	Pauline Schleiter	1904
Bejonnieres	1901	Perdrigon	1903
Bohemian	1895	Pond (<i>Pond's Seedling</i>)	1900
Bonne Ste. Anne	1895	<i>Prince Englebert</i> —Englebert	
Bradshaw	1899	Quackenboss	1898
Brodie	1903	Queen May	1903
Canada Orleans	1898	Quebec	1902
Chataqua	1899	Raynes	1903
Columbia	1898	Red Egg	1898
Cochet père	1901	<i>Reine Claude de Montmorency</i> —Mont- morency	
Communia	1906	Reine Claude dorée	1906
Czar	1900	Richard Trotter	1895
Denniston Superb	1902	Richland	1888
Diamond	1900	Rowley	1903
Duane (<i>Duane's Purple</i>)	1895	Saratoga	1901
Early Red Russian	1895	Shropshire (<i>Shropshire Damson</i>)	1898
Emerald	1903	Smith's Early	1897
Empire	1900	Spanish King	1906
Englebert (<i>Prince Englebert</i>)	1898	Smith's October	1897
Favorite Hative	1908	Tatge	1903
Fellenberg=Italian Prune		Ungarish	1888
Field	1900	Voronezh Blue	1903
<i>General Hand</i> =Hand		Voronezh Yellow	1893
German Prune	1895	Wangenheim	1901
Glass (<i>Glass Seedling</i>)	1893	White Nicholas	1895
Grand Duke	1898	<i>Yellow Moldavka</i> =Moldavka	
Greenfield	1905	Victoria	1895
Green Gage	1899	JAPANESE PLUMS	
Gueii	1898	Abundance	1900
Hand (<i>General Hand</i>)	1898	Berckman's	1903
Hanszwetsche	1900	<i>Botan</i> =Red June	
Horriган	1903	Burbank	1900
Ickworth (<i>Ickworth Imperatrice</i>)	1901	Chabot	1903
Imperial Gage	1900	Engre	1903
Italian Prune (<i>Fellenberg</i>)	1898	Hale	1903
Jaune très hative de Babond	1908	Kerr	1903
John A	1895	October (<i>October Purple</i>)	1903
July Green Gage (<i>Reine Claude hative</i>)	1908	Red June	1894
Kingston	1900	Satsuma	1903
Krikon	1913	<i>Shiro-Smomo</i> =Red June	
Lachine	1903	Willard	1900
Latchford	1907	AMERICANA PLUMS	
Leipsic	1893	Admiral Dewey	1901
Lincoln	1900	Admiral Schley	1901
Lombard	1900	Advance	1903
Lunn	1903	Alma	1907
McLaughlin	1900	American Eagle	1895
Mallard	1903	Anderson	1907
Mirabelle précoce de Floton	1908	Assiniboine	1916
Moldavka (<i>Blue Moldavka</i>)	1895	Atkins	1907
Moldavka (<i>Yellow Moldavka, Voronezh</i>)	1897	Bailey	1903
Monarch	1900	Bender	1900
Monroe	1901	Bixby	1893
Montmorency (<i>Reine Claude de Mont- morency</i>)	1899		

Names of Varieties
and
Date of Planting Oldest Trees—Continued

AMERICANA PLUMS—Continued

Blackhawk..	1893
Bomberger..	1901
Bouncer..	1895
Brackett..	1903
Brittlewood No. 1..	1901
Brittlewood No. 2=U.S..	
Brittlewood No. 3..	1903
Brooklyn..	1903
Bryan (W. J.)..	1903
Budd (Prof.)..	1903
Caro..	1895
Champion..	1895
City..	1895
Coinage..	1903
Colorado (<i>Colorado Queen</i>)..	1895
Colman..	1901
Comfort..	1893
Consul..	1895
Cook Choice..	1906
Corona..	1907
Cottrell..	1895
Craig (Prof.)..	1903
Cyclone..	1901
Dara..	1913
Deepcreek..	1895
Dennis (Dr.)..	1895
De Soto..	1888
Diana..	1901
Don..	1895
Dunlap (<i>Dunlap's No. 1</i>)..	1895
Eldorado..	1901
Emma..	1901
Etta..	1901
Firmana..	1907
Fitzroy..	1907
Forest Garden..	1890
Freestone..	1901
Free Silver=Terrý..	
Galena..	1895
Gaylord..	1895
Gloria..	1907
Golden..	1903
Golden Queen=Queen..	
Hammer..	1895
Hanson..	1901
Hawkeye..	1898
Hazel..	1909
Holt..	1901
Hunt..	1893
Irene..	1895
Ironclad..	1895
Jessie..	1894
Jewell..	1913
Joseph..	1913
Julia..	1901
Kennedy Red..	1897
Kickapoo..	1900
Kieth..	1903
Kilmore..	1909
Lambert (<i>Lambert's Red</i>)..	1897
Large Red Sweet=Plunk..	
Leatherskin..	1907
Legal Tender..	1901

Names of Varieties
and
Date of Planting Oldest Trees—Continued

AMERICANA PLUMS—Concluded

Leonard..	1897
Lester..	1909
Lillie..	1901
Lottie..	1901
Louisa..	1901
Mankato..	1895
Marcellus..	1901
Marjorie..	1903
Marler..	1907
Mary..	1901
Maude Lacey..	1903
Mollie..	1901
Moon..	1899
Nellie..	1895
Nellie Blanche..	1901
Newton Egg..	1897
New Ulm..	1895
Ocheeda..	1895
Old Gold..	1897
Omega..	1901
Patten XXX..	1915
Pearl..	1901
Peffer Premium..	1895
Plunk (<i>Large Red Sweet</i>)..	1897
Purple Yosemite (<i>Yosemite Purple</i>)..	
Quaker..	1895
Queen (<i>Golden Queen</i>)..	1901
Reel..	1901
Rockford..	1892
Rollingstone..	1888
Ruby..	1903
Sada..	1901
Silas Wilson..	1895
Smith..	1901
Speer..	1888
Stella..	1903
Stoddard..	1891
Sunrise..	1895
Swift..	1907
Terry's De Soto..	1903
Terry (<i>Free Silver</i>)..	1902
Teton..	1915
U.S. (<i>Brittlewood No. 2</i>)..	1901
Value..	1903
Van Buren..	1890
Van Deman..	1895
Vesta..	1909
Warren..	1901
Weaver..	1895
Welcome..	1907
Wolf..	1888
Wyant..	1890
Yellow Americana..	1907
Yellow Sweet..	1895
Yosemite Purple—Purple Yosemite..	
Yuteca..	1907

NIGRA PLUMS

Aitkin..	1897
August..	1899
Brandon Ruby..	1903
Carstesen (<i>Earliest</i>)..	1906
Cheney..	1890

Names of Varieties
and
Date of Planting Oldest Trees—Continued

NIGRA PLUMS—Concluded

Gopon	1907
Mammoth	1918
Manitoba No. 4	1895
Manitoba No. 5	1895
Mills Seedling	1890
Odegard	1901
Ottawa	1908
Rhoda	1907
Rideau	1908
Smith Red	1900
Snelling	1894
Victor	1907
Whyte	1893

MINER-LIKE PLUMS

Bestovall	1906
Carver	1895
Clinton	1895
Col. Wilder—Wilder	
Esther	1895
Forest Rose	1893
Idall (Idol)	1895
Iroquois	1895
Miner	1895
Nebraska	1895
Oren	1900
Prairie Flower	1895
Rachel	1897
Surprise	1900
Wier (Wier's Large Red)	1895

WAYLAND-LIKE PLUMS

Benson (Mollie)	1901
Golden Beauty	1895
Moreman	1888
Reed	1895

WILDGOOSE PLUMS

Downing (Charles)	1893
Dunlop (No. 2.)	1895
James Vick	1897
Milton	1893
Roulette	1899
Sophie	1895
Van Houten	1901
Whitaker	1895
Wilder (Col.)	1901
Wildgoose	1898

HYBRID PLUMS

America (Bolton x Robinson)	1901
Ames (P. americana x P. triflora)	1901
Apple (Parentage unknown)	1901
Bartlett (Delaware x P. Simonii)	1901
Bursoto (Burbank x DeSoto)	1913
Chalco (P. Simonii x Burbank)	1903
Cheresoto (P. Besseyi x DeSoto)	1911
Climax (Botan x P. Simonii)	1901
Combination (P. triflora x ?)	1903
Compass Cherry (Prunus Besseyi x Miner)	1901
Sand Cherry	1924
Doris (Parentage unknown)	1903
Duke (P. Munsoniana x ?)	1903

Names of Varieties
and
Date of Planting Oldest Trees—Concluded

HYBRID PLUMS—Concluded

Emerald (P. triflora x P. americana)	1923
Elliott (P. triflora x P. americana)	1923
Excelsior (Kelsey x Wildgoose)	1903
Ezaptan (P. Besseyi x Sultan)	1913
First (Parentage uncertain)	1903
Fourth of July	1913
Freeche	1910
Golden (Gold) (Robinson x Botan)	1903
Goldenrod (Shiro x Howard Yellow)	1923
Goosedye (Wildgoose x Dyehouse cherry?)	1903
Gonzales (Parentage unknown)	1903
Hanska (P. americana x P. Simonii)	1909
Holland (Kelsey x Lone Star)	1903
Humpan (Satsuma x Americana)	1924
Inkpa (P. americana x P. Simonii)	1909
Kaga (P. americana x P. Simonii)	1909
Kahinta (Apple plum x Terry)	1915
Kelbalan (Kelsey x Early Cherry)	1903
Kelmyro (Kelsey x Early Cherry)	1903
Kiowa (Prunus Watsoni x Wolf)	1918
La Crescent (Shiro x Howard Yellow)	1924
Mancheno (Cheney x Manitoba Plum)	
Monitor (P. triflora x P. americana)	1923
Newport (Omaha x Prunus Pissardii)	1924
Nona (P. triflora x P. angustifolia?)	1903
Occident (Parentage unknown)	1903
Omaha (Abundance x Brittlewood)	1906
Opata (P. Besseyi x Gold)	1913
Oyama (Red June x americana?)	1907
Pembina (Manitoba Wild) (P. americana x Red June)	1918
Pendent (Pottawattamie x Forest Garden)	1901
Preserver (Kelsey x Early Red?)	1903
Ragland (Kelsey x Yellow Transparent)	1903
Red Glass (Miner x Quackenboss)	1907
Red May (Abundance x Wildgoose)	1903
Red Wing (Burbank x Wolf)	1924
Rupert (Prunus pumila x P. americana)	1901
Sansoto (P. Besseyi x DeSoto)	1911
Sapa (P. Besseyi x Sultan)	1909
Scarlet (Wildgoose x Cheney)	1907
Shiro (Robinson x Myrobalan x Wickson)	1901
Six Weeks (Abundance x Chickasaw)	1903
Stella (P. triflora x P. americana)	1923
Sultan—Occident	1901
Togo (Red June x P. americana?)	1906
Tombo	1924
Tonka (Burbank x Wolf)	1924
Toka (P. americana x P. Simonii)	1911
Tokata (P. Simonii x DeSoto)	1915
Tokeya (P. Besseyi x Simonii)	
Underwood (Shiro x Wyant)	1923
Wacoma (Burbank x Wolf)	1924
Waneta (P. triflora x P. americana)	1916
Watson (Kelsey x Lone Star?)	1903
Waugh (Chabot x Wayland)	1903
Wickson (P. triflora x P. Simonii)	1903
Winona (P. triflora x P. americana)	1923
Yates (Kelsey x Lone Star?)	1903
Zumbra (Pin x Sweet x Sand Cherry)	1924

POLLINATION OF PLUMS

The pollination of fruits has been given much study during the past thirty years, a number of experimenters having been at work investigating the causes of failure in the setting of fruit, and the importance of having the blossoms fertilized by pollen, which will ensure the setting of the fruit, has been well proved. The plum has received more careful study in regard to pollination than any other fruit. As a result of the experiments of Waugh, Dorsey and others it has been found that, of all the varieties of plums of American origin studied, only two varieties, the Robinson and New Ulm, are self-fertile. In other words, if a tree of any other variety of American origin than the Robinson or New Ulm were planted where its flowers could not be fertilized by the pollen from a tree of another variety, no fruit or practically no fruit would set. The Japanese plums are almost as self-sterile as the American, but more of the European plums are self-fertile although there is a large proportion self-sterile. It will be seen from the above that many varieties of plums are not fertilized at all, or only partly fertilized, by their own pollen. It is necessary, therefore, that varieties be so mixed in the orchard that proper pollination and a good setting of the fruit will be ensured. Americana varieties of plums should be planted to pollenate Americana varieties; Nigra to pollenate Nigra (although Americana will do); Japanese to pollenate Japanese (though Japanese and Americana have been crossed); and European to pollenate European. Some varieties are more suitable than others for cross-fertilization, indeed it may be that certain varieties, though blooming at the same time and closely related, are incompatible or not suited to each other for effecting fertilization. It has been found that, under normal conditions, in Minnesota the plum stigma may remain receptive for about a week, although from four to six days is perhaps the average. This will vary in different places and a much shorter time is given elsewhere. The rate of growth of the pollen tube is important as if this has not made sufficient growth to reach the ovary, fertilization will not take place. If the weather is very wet or too cool this may happen, hence the importance of fine weather and bees to ensure quick pollination and fertilization.

The dates of blooming of plums in different parts of Canada were recorded by fruit growers for the Horticultural division of the Central Experimental Farm for five years. These dates have been compiled and the average of each variety thus obtained. The following is a table of some of the varieties of Americana and Nigra plums recommended in this bulletin, giving their season of blooming. This will be of assistance to fruit growers when planting. A table of the European varieties is not given, as the information obtained was not full enough to be perfectly reliable, and furthermore, the intermixing of European kinds is not so important as with American, as most of the varieties appear to be self-fertile. The Japanese varieties described in this bulletin are all extra early and early bloomers, and will thus pollenate one another.

There is ten days' difference between the time of blooming of the earliest and latest varieties given as examples in the following table, so that it would be impossible for the early blooming varieties to pollenate the late ones, but the early might pollenate the medium, and the medium the medium late. The pistils or female organs of the plum blossoms often mature first, often as much as four days before the anthers containing the pollen. The stigmas may remain in condition to receive the pollen for several days. As pollen is not all shed at the same time, the difference in time of maturity of pistil and anthers is not so important as it otherwise would be.

AMERICANA AND NIGRA PLUMS—SEASON OF BLOOMING

Extra Early.—Aitkin.

Early.—Cheney, Mankato, Odegard.

Medium.—Bixby, Admiral Schley, Omaha.

Medium Late.—Brackett, Wolf, Hawkeye, Stoddard.

PRUNING

The pruning of the trees is not nearly as important in the culture of the plum as of the apple, and there is more danger of injury by over-pruning than too little pruning. While an apple tree will, as a rule, recover from severe pruning, plum trees often never recover from it. In plum culture it is much better to err on the side of under-pruning than over-pruning. The tree should be pruned when young to a symmetrical top with the main branches so disposed that there will be no bad crotches, after which very little pruning is necessary beyond cutting out dead and broken branches and thinning out where the top is very thick. Some varieties will require more pruning than others, some of the Japanese being especially rampant growers. There is a difference of opinion and a difference of results in regard to the heading back of plum trees. As a rule, very good results will be obtained without heading back. A few strong growing varieties, such as Burbank, however, have to be kept cut back to keep them within reasonable limits, and some of the Americana varieties will break down in winter unless headed back. When trees are headed in, the work should be done early in the spring, at which time the ordinary pruning can be done to best advantage. Wounds should be covered with lead paint or grafting wax.

The following note on useful fertilizers for the plum orchard has been prepared for this bulletin by the Chemist of the Experimental Farm.

FERTILIZERS FOR THE PLUM ORCHARD

By Frank T. Shutt, M.A., Dominion Chemist

In common with other orchard crops, the requirements of the plum tree, as regards plant food, are chiefly nitrogen, phosphoric acid, and potash, and these essential elements must be present not only in fair quantities but in more or less readily available forms if vigorous growth and an abundance of fruit are to be expected. In addition, lime is frequently of value, since all stone fruits make a considerable demand upon the available lime of the soil, and this, owing to natural causes or exhaustive cropping, may be reduced to mere traces.

Further, all rational systems of fertilization must include the renewal, from time to time, of the vegetable organic matter of the soil, and this may best be attained when the supply of barnyard manure is insufficient, by the growth and turning under of green crops.

Nitrogen and Organic Matter.—Since these, from an agricultural point of view, are intimately associated the one with the other, the latter being the natural conservator of the former, and economy, as a rule, dictating their use in orchards in such an associated form, we may conveniently consider their application under the same heading.

Barnyard manure undoubtedly stands first on the majority of farms for enriching the soil in these constituents and improving its physical condition. In composition—and hence in value—it is extremely variable, but good average

samples of fresh manure may be considered to contain: nitrogen 0.5%, phosphoric acid 0.25%, potash 0.45%. The organic matter in fresh manure is usually in the neighbourhood of 25%.

With many orchardists, however, the available supply of manure is insufficient and inadequate for the area to be fertilized, and it is for such that the system of green manuring—as by the growth and turning under of a cover crop—is especially valuable. The important role of the cover crop in the modern systems of orchard soil management is set forth in another place in this bulletin and the whole subject of increasing fertility by means of clover has been very fully explained in Bulletin No. 40 of the Experimental Farms series. It will, therefore, only be necessary here to state one or two of the principal reasons why clover or some other of the legumes should be employed for this purpose of enriching and improving the soil.

A vigorous crop of clover will contain at a moderate estimate, in its foliage and roots:—

Nitrogen	from 100 to 150	lbs. per acre.
Phosphoric acid	30 to 45	"
Potash	85 to 115	"

It is evident, therefore, that by this use of clover we can with a single crop furnish the soil with as much nitrogen as would be supplied by a dressing of 10 tons of manure per acre. The greater part of this nitrogen is taken by the clover from the atmosphere, and hence is a distinct addition to the soil. The phosphoric acid, potash and lime, it is true, have been obtained from the soil, but have largely been drawn from a considerable depth and hence increase the stores of these elements in the upper layers of the soil. Moreover, the decay of the clover sets free all these important elements of plant food in forms readily utilizable by trees.

One or two words should also be added regarding the value of the organic matter so supplied. This eventually is converted into humus, the importance of which as a soil constituent it is difficult to over-estimate. It not only liberates slowly and continuously its plant food, but vastly improves the soil texture, whether it be a clay or a sandy loam. It increases the soil's power for absorbing and retaining moisture and it furnishes the best material for the development of microbial life, which, as now known, plays so important a part in increasing a soil's fertility.

There is, of course, a possibility of too great an enrichment with nitrogen by this means; this would be indicated by luxurious and excessive growth, dark-green foliage and poor fruiting. Under such circumstances, the use of organic and nitrogenous fertilizers should be discontinued.

To furnish immediately available nitrogen to young trees showing a deficiency of this element (indicated by a sparse development of foliage of a yellowish-green colour), nitrate of soda may be used as a top dressing, at the rate of 100 to 200 lbs. per acre.

Phosphoric Acid, Potash and Lime.—There is probably no better medium for supplying these elements to orchard soils than unleached hardwood ashes. These should contain from 5 to 6 per cent of potash, in the neighbourhood of 2 to 3 per cent of phosphoric acid, and from 30 to 35 per cent of lime. Not only are these constituents in wood ashes in a condition that renders them readily assimilable, but in many parts of Canada they are cheaper than in any other form of commercial fertilizer. Fifty to eighty bushels per acre is the usual application.

Bone meal should contain from 3 to 4 per cent of nitrogen, and 20 to 24 per cent of phosphoric acid. Since its plant food is only slowly liberated in the soil, it is considered a "lasting" fertilizer and one well adapted to orchard use.

The application is usually about 300 lbs. per acre. Superphosphate will contain from 15 to 20 per cent of phosphoric acid, the greater portion of which should be in a soluble (available) condition. The application is from 200 to 400 lbs. per acre.

Potash can be obtained in the form of muriate (50 per cent actual potash) or as kainit (12 per cent actual potash); 100 to 150 lbs. of the former and 200 to 500 lbs. of the latter are the limits for ordinary application.

Voorhees, in his work on fertilizers, suggests the following mixtures for orchards: (a) one part, or 100 lbs each, of ground bone, superphosphate, and muriate of potash; and (b) a mixture of one and a half parts, or 150 lbs., of ground bone and one part, or 100 lbs., of muriate of potash.

Soils differ so greatly as to their fertility that it is impossible to state definitely the amounts of these fertilizers that could in all cases be used with profit. From 300 to 500 lbs. of such mixtures per acre on fairly good soils would, no doubt, be ample, but on very poor soils these amounts, according to the experience of many orchardists, might be considerably increased.

Lime.—Where lime only is required, by reason of natural deficiency in this element, the excess of humus, sourness, or the refractory character of the soil, it may be applied at the rate of 1 to 2 tons per acre.

CULTIVATION

Plum orchards should be kept under a high state of cultivation or otherwise the fruit is likely to be small. The plum requires a large amount of moisture. The surface soil should be stirred about once a week or after every heavy rain until July in order to conserve moisture and to open the soil so that the air can get in freely and assist in nitrification and help promote a thrifty growth of the trees. Trees sometimes produce good crops of plums when they are growing in sod but this is not the rule. It has been found that there is more than twice as much moisture when the ground is cultivated than where there is sod. Furthermore, the curculio becomes very troublesome in sod orchards, and for this reason, if for no other, the orchard should be kept cultivated. Cultivation should be discontinued towards the middle of July, in order that the wood may ripen in good time and that a good cover crop may be established. Where trees are planted close and cultivation is difficult it will be preferable to mulch the trees with grass or straw than to leave them in sod, as the fruit will be larger and the trees more thrifty.

COVER CROPS

A cover crop is a crop of some kind the seed for which is planted for the purpose of having a growing crop in the orchard after cultivation has ceased, in order to help use up plant food which has been made available during the summer and which might leach away if the soil were bare. A more important purpose still of this crop, especially in some localities, is to have a covering which will protect the roots of the trees and help to hold the snow in winter. A third important use of the cover crop is to have some vegetable matter to plough under in the spring to improve the soil both by adding humus and by adding nitrogen where leguminous plants are used.

Experiments with cover crops have been carried on rather extensively at the Central Experimental Farm for the past twenty-eight years, and it has been found that the most satisfactory plant for this purpose is the common red clover, sown not later than the middle of July at the rate of 10 to 12 lbs. per acre, no nurse crop being used as a rule. The hairy vetch (*Vicia villosa*) has given good satisfaction in some places, especially in the Niagara peninsula and in British Columbia, and has the advantage of growing very late in the

autumn. This may be sown at the rate of 40 or 50 lbs. per acre with good results. The seed of the Summer Vetch or tares is much cheaper, and where it succeeds may be planted instead. Where it is not especially desired to add nitrogen to the soil, rape makes a good cover crop if sown at the rate of from 4 to 6 lb. per acre. It is not necessary that the plant used as a cover crop should live over winter.

Sometimes it is not possible owing to dry weather, to get a good cover crop by sowing about the middle or latter half of July. Experiments at the Central Experimental Farm were made to learn how satisfactory plants in drills two feet or more apart would prove as cover crops. The object of planting this way is that the seed may be sown early enough to ensue a good crop and yet the soil be cultivated until the usual time. Soy beans, horse beans, and hairy vetch were used for this purpose. This method is said to have given good satisfaction where it has been tried. Soy beans and horse beans did particularly well when grown in this way. If the soil suffers from lack of moisture in a dry time, the cover crop should be ploughed under as early in the spring as possible and cultivation begun. By doing this, much of the moisture which would otherwise be transpired through the leaves of the growing plants would be conserved. In the irrigated districts of British Columbia the hairy vetch is kept continuously, the seed being disced in, when ripe, with the leaves and stalks.

PICKING, PACKING, STORING AND MARKETING THE FRUIT

Experience only will teach the fruit grower the proper time to pick each variety of plum for storing or shipping, as some may be picked greener and some riper than others. As a rule, however, the European plums should be picked when they are well coloured but still quite firm. It is particularly desirable to pick those varieties which are subject to rot, a little on the green side. The Americana varieties are so juicy that they also have to be picked before fully ripe if they are to be shipped far. They may be shaken from the tree into a cotton sheet while still firm and in good condition for the local market, thus lessening very much the cost of gathering. The Japanese varieties may be picked earlier than either of the preceding as the colour and flavour will develop well even though harvested when rather on the green side. Plums should be picked with the stems on when it is possible to do so, and on no account should they be shaken from the tree when intended for shipment. A stepladder to stand on and a strong basket to put the fruit in are necessary. Plums are usually sold in medium sized fruit baskets, the six quart baskets being preferred. It is sometimes advisable when the fruit is especially fine to face the basket, thus giving the fruit a still more attractive appearance, but if this is done the face should represent the kind of fruit to be found lower down. Some varieties of plums will keep for several weeks in cool or cold storage. A temperature of from 36 to 42 degrees Fahrenheit has been found the best for storing this fruit.

The marketing of the plums will depend very much on the location of the orchard. The greatest care should be observed to have the fruit reach the market in prime condition, and if it is consigned to a commission merchant he should be one of recognized integrity.

Thinning the Fruit.—Until quite recent years the thinning of plums on the trees had not been practised very extensively. Plum orchards have increased so much, however, in size and number that the competition has been keener and the prices lower, and in consequence the most advanced growers are now thinning their fruit, and find it profitable to do so, as the prices obtained for the larger fruit more than compensate for the labour required in thinning. Furthermore, if part of the fruit is picked when green it does not have to be picked when ripe, so there is little extra handling. Some varieties of plum trees bear

very heavily, and this is particularly true of the Americana varieties. In consequence, the fruit when unthinned is much smaller than it would be if there were less of it, and the drain upon the vitality of the tree from the production of so much seed shows itself before long, and it frequently happens, especially in poorly tilled and poorly fertilized orchards, that trees literally bear themselves to death.

The time to thin is after the fruit is well set and when it is fairly certain what the crop is going to be. There is always a dropping of plums during the month of June, caused principally by improper pollination, natural thinning and injury from curculio, and as soon as possible after these have thinned the crop, hand thinning should be done. The Americana plums fruit so heavily that, in an experiment conducted at the Wisconsin Experiment Station, it was found that nearly four-fifths of the crop should be removed in order to get really satisfactory results. When Americana plums were thinned as heavily as this the fruit was left about two inches apart, which was found a good distance in the experiment, but a greater distance was suggested. Experiments in thinning Americana plums at the Central Experimental Farm resulted in the thinned fruit when ripe being considerably larger than that unthinned.

Some varieties of European and Japanese plums are left as much as six inches apart by fruit growers, and at this distance profitable crops are said to be obtained of fruit of the best quality. From one-fourth to one-half the crop should be removed in thinning. The most profitable distance apart to leave the plums will be largely governed by the variety. Some varieties will not need thinning at all, and even where trees are bearing heavily, the scarcity and cost of labour may prevent the profitable thinning of the fruit.

CANNING AND PRESERVING AMERICAN AND HYBRID PLUMS

All good housewives are familiar with the way to can and preserve European plums, but the American varieties require different treatment in order to get the most satisfactory results. Some varieties are thick in the skin, while others are more or less astringent, and for these reasons special methods are employed to make the fruit more palatable. The skin of many varieties may be readily removed by pouring boiling water on the fruit and then peeling it. Preserves made from fruit thus treated are very good. The skin of some varieties will not break down in cooking, and peeling is especially desirable in such cases.

American plums are not as good for canning as the European, and, if they are canned, are best for making pies.

The following varieties of American and Hybrid plums were preserved, in order to learn what differences there were in these kinds for this purpose. These were preserved with the skin. None of the varieties tested was found markedly astringent, though most of them had a flavour, which though not unpleasant, is peculiar to the American plums. The proper proportions to be used in preserving each variety will have to be learned by experience. The recipe for preserving adopted was that suggested by Mrs. Dora M. Robson, Ottawa, Ont., and is as follows:

The plums should not be quite ripe, but partly red and partly yellow. No ripe or all red plums should be used, and to this is attributed part of the success of this formula. The fruit is weighed and put into a preserving kettle at the back of the range, a few of the plums being crushed. The fruit is left here until the slow heat draws the juices out, then the preserving kettle is drawn forward and the plums cooked slowly until they are thoroughly done. One pound of heated sugar is then added to one pound of the fruit, including stones and skin. The fruit is then left on the range just long enough to be sure all the sugar is melted and boiled up once, probably about three minutes. No

water is put with the plums. The skin of the plums in jam made thus usually dissolves, and one would scarcely know that the skin had not been removed before preserving.

PLUM JAM—TESTS MADE IN 1919

Variety	Proportion of sugar	Relative Trans-lucency before opening 10 points	Relative appear-ance before opening 10 points	Relative appear-ance after opening 10 points	Colour, 10 points	Consis-tency 10 points	Flavour: Very good, Good, Medium Poor	Relative Flavour, 10 points	Sweetness: Too sweet, Too sour, Just right
Admiral Schley...	1 lb. sugar, 1 lb. fruit	7	8½	7	7	6	Medium	7½	Too sweet
Atkins.....	1 lb. sugar, 1 lb. fruit	6	8	7	7	6	Medium	7½	Just right
Bixby.....	1 lb. sugar, 1 lb. fruit	8½	8½	6	6	6	Poor	5	Too sour
Cheney.....	1 lb. sugar, 1 lb. fruit	5	7	7½	8	6	Very good	8½	Just right
Cheresoto	1 lb. sugar, 1 lb. fruit	8½	9	7	7½	8	Very good	9½	Just right
Emerald.....	1 lb. sugar, 1 lb. fruit	7	8	7	7	7½	Medium	7½	Too sour
Ezaptan.....	1 lb. sugar, 1 lb. fruit	8½	9½	7	7½	8	Very good	9	Just right
Fourth of July....	1 lb. sugar, 1 lb. fruit	7	8½	9½	9½	8	Very good	9	Too sour
Golden Queen....	1 lb. sugar, 1 lb. fruit	7½	8½	9	8½	8	Medium	7	Just right
Joseph.....	1 lb. sugar, 1 lb. fruit	8	8½	9	9	9	Good	8	Just right
Jewel.....	1 lb. sugar, 1 lb. fruit	6	7½	8	7	6	Medium	7½	Just right
Legal Tender....	1 lb. sugar, 1 lb. fruit	9	8½	9½	8½	8½	Medium	7	Just right
Odegard.....	1 lb. sugar, 1 lb. fruit	5	7	8½	7½	8	Very good	8½	Just right
Quaker.....	1 lb. sugar, 1 lb. fruit	6	7	8½	9	7	Medium	7½	Too sour
Scarlet.....	1 lb. sugar, 1 lb. fruit	8	8½	9	9	9	Medium	6½	Just right
Sansoto.....	1 lb. sugar, 1 lb. fruit	5	7	7½	7½	7½	Very good	8½	Just right
Terry.....	1 lb. sugar, 1 lb. fruit	7	8	8	7	8	Medium	7½	Too sour
W. J. Bryan.....	1 lb. sugar, 1 lb. fruit	6½	7½	7	7½	6	Poor	5	Too sour

The following recipes for canning and preserving American plums, published by the late Prof. Goff, of the Wisconsin Experiment Station, were also consulted in making preserves:—

“The native plums, especially those with firm pulp, after being treated by any of the methods mentioned below, are well adapted to all purposes for which the foreign plums are used. As a rule, more sugar is required for the native plums, but the preparations are rich in proportion. The harshness in the skin and stone of some native plums is readily removed by steaming them in an ordinary cooking steamer until the skin cracks; or pour over them boiling water to which has been added common baking soda in the proportion of half a teaspoonful to a quart. The thicker skinned varieties may be readily peeled by placing them in boiling water two or three minutes. The recipes follow:—

Canning.—Pick the fruit when well coloured but a little hard, steam or cook in a porcelain-lined kettle until tender, put in cans that have first been treated to boiling water, and cover with boiling syrup made of equal parts of granulated sugar and water, filling the can to the top; then run a silver knife around the can inside and let out the air, and seal at once. Plums cooked in the syrup are likely to be tough. Canned plums may be used for pies and for mixing with or flavouring other fruit. Plums are often canned without sugar to be used in winter for making fresh plum butter. The juice of canned plums makes excellent jelly. One lady recommends splitting native plums to the stone on one side before cooking, to avoid crumbling.

Drying.—De Soto, Wyant, and doubtless other varieties, may be pared, pitted and spread on plates, lightly sprinkled with sugar and dried, first in the oven and later in the sun. Cook like dried peaches.

Plum Jelly.—The fruit should be gathered when only part ripe—about half coloured. This point is very essential. Put plums in a large granite or porcelain kettle—the latter is best—with barely enough water to cover them. Cook until tender, but not until they are in a pulpy mass. Having previously covered a large jar with a cloth, strain the fruit in and let the juice drop through, but do not squeeze. When all has drained through, strain once or twice more through another cloth, until the juice is perfectly clear. To one measure of juice provide one measure of granulated sugar, but do not put together at once. A very important point in the making of all jelly is that only a small quantity should be cooked at one time. Into a medium sized kettle put, say, four tumblers of juice, let it boil briskly fifteen or twenty minutes, then add the four tumblers of sugar, and in a very short time, usually from three to ten minutes, the jelly will be finished, light, clear and delicious. To test the jelly, dip a spoon into the boiling juice and sugar and hold it up; when the jelly clings to the spoon in thick drops, take it off quickly and put into jelly glasses. The plum pulp which is left can be put through a colander and used for plum butter.

Another recipe. *Plum Preserves.*—Take equal weights of fruit and sugar, place in stone jar a layer of fruit, then a layer of sugar, alternating thus until quantity desired is reached. Let stand over night; in the morning drain off the syrup that will have formed, into a porcelain kettle, place same over a fire and let syrup come to a boil, then pour it over fruit in jar again; repeat this every day until the fourth heating, when fruit and syrup are both put in kettle and boiled for a few minutes. Place same in glass jars while hot, seal and put away in some cool and preferably dark place.

Still another recipe.—To each pound of plums add a pound of sugar, put the fruit into boiling water until the skins will slip; peel and sprinkle sugar upon each layer of fruit in a bowl, allowing them to stand over night, then pour off the juice, bring quickly to a boil, skim and add the plums, cook very slowly till tender and clear, which will take about one-half hour; take them out carefully and put into a pan, boil the syrup for a few minutes longer until it thickens, pour it over the fruit, seal or tie them up."

SPRAYING

It should not now be necessary to point out the advantages of spraying to control insect enemies and fungous diseases, as so much has been said and written on this subject. The beneficial results where spraying has been thoroughly done and the conditions have been favourable have also been so marked that the advantages of spraying need no further proof. It is, however, found necessary to continually advocate this practice. Fruit growers become discouraged after an unfavourable season for spraying, when the conditions are favourable for the development of fungi and rainy weather prevents the applica-

tion of mixtures altogether or which if applied are washed off by the rain almost as soon as the work is done. With an experience of this kind fruit growers are often inclined to stop spraying and let Nature take her course. It sometimes happens, however, that the mixtures and solutions have been improperly made or the wrong mixture has been used to destroy a certain insect or disease and the fruit grower wonders why he does not get good results. It is more frequently the case, however, that the spraying is not thoroughly done. The object of spraying is to cover the leaves, fruit and bark with the fungicides and insecticides in order that the latter may destroy the insects or diseases which come in contact with them, and in order that the materials may be distributed evenly over the tree it should be forced out of the pump in a fine mist-like spray, to accomplish which it is necessary to have a good nozzle. If the trees are not covered with the mixtures and solutions at all times when the insects and diseases may be affected by them, the trees and fruit may be injured just in proportion to the thoroughness and continuity with which the work is done. It is, therefore, important that every fruit grower should know the life history of every insect and disease which injures his trees or fruit, in order that he may know the best time to spray for each enemy. A spraying calendar has been published at intervals at the Central Experimental Farm, in which are given full directions for the preparation of the different formulæ recommended and the time when each spraying should be made. These calendars are of great value to fruit growers and should be in the hands of everyone. Although a certain number of applications are recommended for the prevention and control of the different insects and diseases referred to, it may be necessary to make more. If, for instance, a heavy rain came on, say within a few hours after a spraying had been made, which washed most of the material off, another application should be made as this might be the very time when the disease or insect which it is desirable to control is making the greatest headway. It is often too late, also, when a spraying for a certain purpose is made, and labour and material are thus practically lost. Spraying is rather expensive when there is a large orchard to cover. It is, therefore, very important that the right mixtures and solutions are used; that they are prepared properly and applied thoroughly, constantly and at the right time, and that the trees be kept covered with the mixtures and solutions during all the time when injury is likely to occur.

As the mixtures and solutions may have very injurious effects on the trees if improperly made, and as they may prove of little or no value if not applied at the right time, the formulæ recommended in this bulletin should be closely followed.

DISEASES OF PLUMS AND THEIR CONTROL

By H. R. McLarty, M.A., Plant Pathologist, Division of Botany,
Dominion Experimental Farms

It is now well recognized among growers that a knowledge of fruit tree diseases and their control is essential to the growing of good fruit. In a general way, it is necessary for the orchardist to understand how the disease is produced in the tree, whether it be by fungus, bacterium or unsuitable environment, and knowing such, to apply intelligently those methods of control that experiment has proven to be of the best practical value. Whenever a control measure is being applied, the worker should keep clearly in mind the reason why such and such a thing is being done. He should understand the effect that each control measure will have on the development of the disease in question. A few of the cardinal points in disease control might here be mentioned. When once a fungus has penetrated into the tissues of any part of a tree, it ought to

be clearly understood that an application of spray to the exterior will not kill that fungus. The great value of spraying is to prevent the germination of spores which may chance to alight on a susceptible part of the tree. It stands to reason therefore, that all the parts of a tree, to be protected, should be wholly covered with the spray material. It is not enough to have a drop here and there when there is ample room left between them for a spore to germinate and penetrate into the tissues. It is obvious too, that, in order to protect a surface, the film of spray material must remain thereon as long as the part is exposed to infection. For example, suppose a heavy rain should occur a short time after the application of a spray and the latter were all washed off. No amount of hoping on the part of the grower that the spray would still have some protective value would have the least influence in preventing the germination of spores which might subsequently alight on his trees. The importance of using only standard spray materials cannot be too highly recommended. Trees are very susceptible to injury from sprays not properly made, or not applied at the proper strength. Moreover, sprays which are incorrectly made may have little or no value as a fungicide, and the money spent in making and applying them is altogether lost. It is important to follow directions carefully. A point should also be noted in connection with the cutting out of cankers and knots. It is necessary not only to cut out the canker, but to cut beyond the furthest point to which the fungus has advanced in the tissues; in other words, to cut back well into the clean white wood. It is also a very good policy to destroy by burning, all cuttings and diseased portions of the tree. Not only is it a clean orchard practice, but in many cases it is essential in preventing further production of spores from this tissue.

Plant diseases can be controlled, but they must be fought squarely, the facts concerning their method of attack understood and the control measure intelligently and carefully applied. The diseases that are here described are those which are of most common occurrence on the plum.

BLACK KNOT (*Dibotryon morbosum* (SCHW.) T. & S.)

This trouble is one of the most commonly known diseases of the Plum and Cherry throughout Canada. It is, moreover, under certain circumstances, as destructive as it is common. If left unchecked, whole orchards may in a short time be destroyed. Practically all varieties of plums and nearly all varieties of cherries are attacked.

The disease affects only the woody parts of the tree and as a rule only the twigs. Occasionally, however, knots are found on the larger limbs. As the name suggests, black knots are produced. These appear as wart-like outgrowths on the twigs, varying in length from one-half inch to a foot or more. Usually, the knots do not extend around the limb but have their long axes parallel with that of the branch. The first evidence that a knot is beginning, appears as a swelling on the branch, sometimes noticeable in late autumn, but seen more clearly as spring approaches. In the spring, the bark is ruptured by the growth within and a yellowish surface is exposed. This colour lasts only a short time, after which the knot takes on a velvety olive green appearance. By June, this surface turns black, first in spots and later, over the whole surface. The knot has now taken on the appearance that is so characteristic and well known.

The fungus causing the disease is spread by means of spores that are produced in the knots. When a spore alights on a tender branch, in a crotch, or other vulnerable spot on the tree, and conditions are favourable for growth, infection of the branch results. As spores are produced from early spring to the middle of summer, infection may take place over a considerable period. When the fungus has once gained an entrance, it develops and produces a substance which causes the branch to swell. By the following spring, the enlarge-

ment of the branch has become so great that the bark is broken. When this is accomplished, the fungus grows to the surface and there produces its first crop of spores. The production of these gives to the surface its velvety green appearance. As the season advances, the fungus enters another stage and the surface of the knot becomes black and covered with minute elevations. Under each of these, there is developed during the winter a great number of spores. By late winter or early spring, these spores are mature, and on being released, are distributed by the wind throughout the orchard. The knot, however, has not yet done all the damage of which it is capable. The central part now dies, but the edges remain alive and go on producing summer and winter spores until the knot is sometimes over a foot in length.

Eradication of all the knots is the proven and practical means of control. This can best be done when pruning operations are in progress in the late fall or early winter, before the winter spores are produced. Small diseased branches should be cut off at least three inches below the knot. Where knots occur on important branches, they can be removed by careful cutting away of all diseased tissue and by a good disinfection of the wound. After disinfection, the wound should be painted over with white lead. Where trees are badly diseased, they should be up-rooted and destroyed. All diseased twigs and cuttings from knots must immediately be burned; otherwise, the spores within will mature and by their dispersal expose the orchard to further infection.

In some places, spraying has been carried out with satisfactory results. In spraying, the purpose is to protect the trees during the period that they are exposed to infection. A good dormant spray should be applied just before the trees become active in the spring, followed by summer sprays coming just before the buds open, just after the petals fall and again two weeks later. This practice will lessen the number of infections, but of itself, will not eradicate the disease. The careful pruning of all diseased branches must also be carried out.

In orchard districts where the disease has become severe, it is impossible for an individual grower to keep his orchard clean when neighbouring orchards are allowed to remain diseased. To get control, the community must work together. Careful search should also be made for infections on wild cherry or plums in the neighbourhood. If any are diseased, they should be cut down and destroyed.

BROWN ROT

(*Sclerotinia cinerea* (Bon.) Schröt.)

Brown rot is an old and well known disease, being very destructive not only in plums but in stone fruits in general. As a rule, the disease makes its first appearance on the blossoms, causing them to turn brown and die. A condition very favourable for such an infection is a wet spring following on a cold winter. The trouble extends down the pedicel, entering the shoots at the base of the bud and is often accompanied by a gumming on the surface of the shoots. The gum adhering to the dead blossom holds it to the twig for several weeks after it has been killed and is a means of detecting the trouble. When infection occurs on a lateral, and the disease reaches the shoot, the latter often becomes girdled and dies. Following blossom infection, the disease does not usually manifest itself until about the time the fruit matures. The infection is first noticeable through the appearance of small, brown spots on the skin of the fruit. In the beginning, the spots are not very clearly defined, but as the disease develops, the outline becomes more distinct and within a short time, small sporebearing tufts appear toward the centre of the diseased area. In a few days, the whole fruit is involved, becoming brown and wrinkled. The tufts now cover the whole surface, giving it a gray powdered appearance.

Later, the infected fruit becomes hard and wrinkled, forming the "mummy" that is so well known. Such of these as remain on the tree continue to provide a source of infection for a year, as they will produce spores as often as, and whenever favourable conditions occur during that time. The mummies which fall on the ground continue to produce spores for a time, but later the fungus goes into what is called a resting stage. The following spring, activity is renewed and a different type of spore is produced. These are dispersed during the blossoming period only. If a mummy is buried more than one inch in the soil, this type of spore will not be produced. The fungus, however, can live in its resting stage for several years and will produce spores in the spring if suitable weather conditions prevail and the mummies work up to within an inch of the surface.

Brown Rot is not an easy disease to control, since it attacks almost any part of the tree above ground and because the danger of infection is always present during the growing season. It is of primary importance, of course, to protect the fruit by sprays from the blossom period until it is marketed. At least three sprays should be applied; the first, just before the blossom buds open, the second, just after the blossoms fall and the third about two weeks later. If the attack has been severe, additional sprays should be applied as the season advances. Lime Sulphur, summer strength, is a very good spray for the purpose. Thinning in order to prevent the plums from touching each other also removes many lodging places for the spores. All blighted twigs and cankers, if there are any, should be removed and burned. All mummies should be taken from the trees and burned. With plums it is often difficult to gather up all mummies on the ground, and in this case, they should be buried to a depth of at least one inch below the surface of the soil. It is important to remember that the same disease attacks all stone fruits and elimination of all sources of infection from such trees is therefore necessary.

PLUM POCKET (*Exoascus pruni* Fckl.)

While this disease does not, as a rule, do very great damage in Canada, there are cases on record where the losses have been quite severe. The wild plum is particularly subject to this disease, and as, in the colder parts of Canada, the people have to depend on the wild plum for this fruit, it becomes a more important disease than in the districts where plums are grown commercially. It is chiefly the fruit which is affected, but young branches and leaves are also attacked. The disease makes its appearance in the spring soon after the petals have fallen; by the end of June or early in July, the disease has run its course and the affected fruits have nearly all fallen to the ground. At first, the diseased plums appear swollen and can be detected from the healthy fruit by their pale yellow or reddish colour. Later on, the surface becomes covered with a grayish powder which is the spores of the fungus. In the final stage, the fruit turns black or almost so and becomes quite hard and brittle. After remaining on the tree for a few days in this stage it falls to the ground.

Tender branches and leaves are also affected. Due to the action of the fungus, they often become much distorted and gray masses of spores, similar to those on the fruit, occur on the affected parts. Diseased branches should be especially watched for, as they play an important part in the spread of the disease.

The cause of this trouble is due to a fungus very closely related to that causing Peach Leaf Curl. The parasite spends the winter in a dormant state, in the diseased branches. As the warm weather of spring comes, activity and growth are renewed and the fungus penetrates the young ovary of the developing fruit, causing swelling and marked distortion in the fruit. When sufficiently developed, the fungus pushes its branches to the surface and there produces spores, which appear as a gray powdery coating.

Satisfactory means of control have not yet been developed, but the disease can certainly be lessened by careful pruning of all diseased twigs. It has also been shown that, where thorough spraying has been carried on, the number of diseased plums was very few. Two applications of Lime Sulphur or Bordeaux, the first just before the blossom buds open, and the second just after the petals have fallen, are recommended.

SILVER LEAF (*Stereum purpureum* Fries)

In Canada, this disease is very widely distributed, being known from Vancouver Island to Nova Scotia. Although it is perhaps best known here, on the apple, it is primarily a disease of plums and it may therefore be in order to give a short description in order that its appearance on the plum may be recognized. In England, it has become a very serious menace to this fruit and recently, very drastic legislation has been enacted to prevent its further spread.

The external signs of the disease are confined to the leaves. In the beginning, the trouble is usually confined to one branch, the leaves developing an unmistakable silvery or leaden sheen. This appearance is due to the formation of air spaces beneath the skin of the leaf, due to a splitting of the tissues in the interior of the leaf. Other branches become affected, some of the leaves often showing brown streaks and stains. Affected branches begin to die back or sometimes, the entire branch dies suddenly. At this stage, the whole tree often becomes affected, all the leaves appearing silvered and death soon follows. The fruiting stage of the fungus later appears on the dead wood. There appear purplish crusts crowded together in irregular rows and it is from these that the spores are produced. The latter, being borne about by the wind, cause new infections, provided an entrance can be obtained through a wound.

Although a great deal of research has been carried out, no reliable cure has been found. The only means of control therefore, is to take stringent measures against its spread. In slightly affected trees, cut off the branch affected below the point where the last brown stain appears in the wood; paint over the cut; and burn the pruned limb. Dead or dying trees should be completely uprooted and destroyed.

SHOT HOLE OR LEAF SPOT (*Coccomyces prunophorae* Higg., *Cylindosporium*)

Shot hole, leaf spot or yellow leaf is a very common disease in plums. The damage which it causes to the trees is not easily measured, but it lowers the quality of the fruit, weakens to a marked degree the vitality of the tree and renders it more susceptible to attack by other disease producing organisms. As the name suggests, the trouble occurs on the foliage. Toward the end of May or early in June, affected leaves exhibit slightly discoloured, dark blue areas on the upper surface, which change, in about a week's time, to dark red or reddish brown. The whole leaf now tends to turn yellow and the dropping out of many of the brown spots gives it its shot hole appearance. If the infection has been severe, partial defoliation often occurs in July.

During the winter, the fungus lives over in the diseased leaves that have fallen to the ground during the previous fall. In the spring, a crop of spores is produced and spread by the wind throughout the orchard. By sending out a germ tube which grows in the tissues of the leaf, these spores are able to start new infections wherever they reach the new leaves. In a week or ten days after the fungus has gained an entrance into the leaf, the characteristic spot appears. During the summer, a crop of spores is produced on the diseased spots, whether the infected part remains in the leaf on the tree or whether it has fallen to the ground. These spores, in their turn, are carried by the wind, thus further spreading the infection.

Elimination of the old leaves and the protection of the new leaves during the growing season are the proven means of control. As a general rule, however, efficient spraying gives satisfactory results. Recommendations are for a Lime Sulphur spray, to be applied at summer strength, just before the buds open, immediately after the blossoms fall and again about ten days after the second application. Bordeaux mixture is also used.

FROST INJURY

Plums are quite susceptible to frost or winter injury. A type commonly met with is Sun Scald. In this trouble, the bark is killed on the southwest side of the tree. Should such injury be found, pare away the dead bark, disinfect, and later, paint over the sound heart wood with white lead. This procedure will greatly lengthen the life of the tree. To prevent the injury, the trees are often sprayed or painted with whitewash.

COLLAR ROT (*Armillaria mellea* Vahl.)

This is another type of injury which is frequently met with. A rot occurs at the crown of the tree which gradually spreads until the trunk is girdled and the tree killed. A fungus, *Armillaria mellea*, has very often been found associated with the trouble and is held by many to be its cause. A primary injury to the crown of the tree however, has without doubt much to do with the entrance of the fungus. Injury by frost, by rodents or by cultivating tools is of very common occurrence.

It is a good policy to examine around the crown of the tree occasionally to see if it is in a healthy condition. If a rot has started, clean away the dirt around the tree, cut out the rotted portion carefully, disinfect with corrosive sublimate and leave the wound exposed to the sun's rays the remainder of the summer. In the fall, paint over the exposed part with white lead and fill in the dirt again.

DIRECTIONS FOR SPRAYING OF PLUMS

To give efficient control of the foregoing diseases, in so far as that can be accomplished by spraying, the following Spray Schedule is recommended:

Dormant Spray.—This should be applied early in the spring while the trees are yet dormant. Use Lime Sulphur with Spreader; strength of Lime Sulphur, one gallon of commercial liquid Lime Sulphur to nine gallons of water. This spray is to insure a general clean up of all spores on the tree, especially, spores of Black Knot.

First Summer Spray.—This application should be made just before the blossom buds open. Use Lime Sulphur with Spreader one gallon commercial Lime Sulphur to forty gallons water. This spray is for protection against leaf diseases, Brown Rot, Plum Pocket and Black Knot.

Second Summer Spray.—Apply immediately after the blossoms fall. Use Lime Sulphur with Spreader, one gallon commercial L.S. to forty gallons water. This spray is to protect against leaf diseases, Brown Rot, Plum Pocket and Black Knot.

Third Summer Spray.—Apply about ten days after second summer spray. Use L.S. with Spreader, one gallon commercial L.S. with forty gallons water. This spray is to protect against leaf diseases, Brown Rot and Black Knot.

Additional Sprays.—If season is very wet, additional sprays of summer strength should be applied at intervals of two weeks until a month before picking-time.

Note.—Lead arsenate should be added to the above summer sprays for the control of insects.

The sprays should be applied with a pressure of from 200 to 250 pounds. This insures a fine spray that will give good covering power.

Spreaders have recently come into use and are of considerable assistance. The value of the spreader is that it spreads the spray into a very thin film and prevents its coagulating into little drops. Either Saponin or Casein can be used with Lime Sulphur.

STANDARD SPRAY MATERIALS AND DISINFECTANTS FOR CONTROL OF PLUM DISEASES

Commercial Lime Sulphur.—Lime sulphur has, during recent years, gained a great popularity among fruit growers. It is now prepared by commercial houses and can be readily obtained on the market. It comes in two forms, liquid and dry, both of which have given very good results in the control of fungus diseases.

Bordeaux.—This material, prepared from copper sulphate, lime and water has for many years been the standard spray for fungus control. Several combinations of its ingredients have from time to time been suggested. A standard formula, however, is as follows:

Copper sulphate	4 pounds
Unslaked lime	4 pounds
Water	40 gallons.

The equipment to make barrel lots of this spray should be: a forty gallon barrel, two tubs of at least twenty gallons each, two buckets, a paddle and a coarse sack. To prepare the mixture, arrange the tubs so that one is on either side of the barrel. Place in one of the tubs twenty gallons of water and dissolve in it four pounds of Bluestone. This can best be done by suspending the Bluestone in a coarse sack just below the surface of the water. In the other tub, carefully slake four pounds of lime with hot water, being careful to use just enough water to form a thick paste. When this has cooled, dilute to twenty gallons with water. The contents of the two tubs are now ready to mix. Thoroughly stir the contents of both tubs, then pour a bucketful from each simultaneously into the barrel, being careful that the two streams mix. Two persons will be necessary for this operation. Continue in this manner until the contents of both tubs are emptied into the barrel. Thoroughly stir the resulting blue mixture and strain into the spray tank. The preparation is now ready for use.

Corrosive Sublimate (Mercuric Chloride).—This is a standard disinfectant for all wounds. It can be obtained in tablet form from any druggist. One tablet, dissolved in a pint of water gives a solution of proper strength for disinfecting purposes.

Paint.—Pure white lead and linseed oil is the best covering for a wound after disinfection with Corrosive Sublimate.

Spreaders.—*Casein*: This material can now be purchased on the market ready for use in sprays, or it can be prepared at home. Use commercial Casein at the rate of 4 ounces to 160 gallons of spray. To get Casein into solution, it should be boiled from ten to fifteen minutes in a small quantity of water to which has been added one-seventh as much sodium hydroxide as Casein used. It is often convenient to prepare a stock solution and to add a proportional quantity to each tank.

Saponin:—This can be prepared very easily by boiling soap tree bark in water. Soap tree bark can be obtained from a druggist in one or two-ounce packages. Add two ounces to a quart of water and boil fifteen minutes. Strain and use clear solution for 160 gallons of spray.

INSECTS AFFECTING PLUM TREES

(Contributed by the Entomological Branch, Department of Agriculture)

There are several important insects which almost every year effect serious injury to plum trees, either to the fruit or to the foliage. The following information prepared by officers of the Entomological Branch will assist fruit growers in their efforts to protect plum trees from insect attack. Enquiries regarding insect pests should be directed to the Dominion Entomologist, Department of Agriculture, Ottawa. Letters and packages containing insects or their work, weighing up to twelve ounces, may be sent through the mails free of postage.

INSECTICIDES AND FUNGICIDES

Arsenate of Lead.—One and one-half pounds powder or 3 pounds paste to 40 gallons of water. This arsenical can be used alone or in combination with lime sulphur or Bordeaux mixture.

Nicotine Sulphate.—Several 40 per cent nicotine sulphate preparations are on the market and are used at the rate of $\frac{3}{4}$ to 1 pint to 100 gallons of spray. They may be combined with any orchard spray. When used alone, 4 pounds of dissolved soap should be added to every 100 gallons of spray.

Bordeaux Mixture.—(See page).

Commercial Lime Sulphur Wash.—For dormant and delayed dormant applications, use 1 gallon to 7 gallons of water. For summer applications use 1 gallon to 40 gallons of water.

IMPORTANT INSECT ENEMIES OF THE PLUM TREE

Plum Aphids.—Plum trees are frequently attacked by small, soft-bodied wingless or winged insects called aphids or plant lice, which cluster usually in dense colonies, on the undersides of the leaves and on the tender shoots. Four species are commonly found on plum, viz: the mealy plum louse, *Hyalopterus arundinis*, the most troublesome species, greenish in colour and covered with a fine white powder, the hop aphis, *Phorodon humuli*, likewise green in colour, but with no coat of white powder; the thistle aphis, *Anuraphis cardui*, a shiny green and black insect; and the water-lily aphis, *Rhopalosiphum nymphæ*, a brownish species.

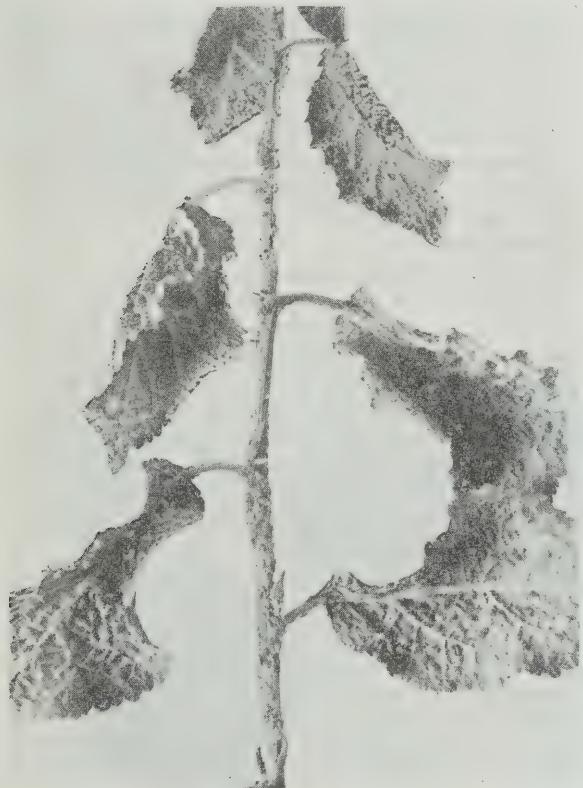
Life cycles. The four species pass the winter in the egg stage on plum trees. The aphids hatch early in the spring and feed on the opening buds and on the leaves. When mature they give birth, without the intervention of the male, to living young, which in a comparatively short time reach maturity, and likewise proceed to reproduce. The insects continue to multiply rapidly until, if conditions are favourable, the leaves and shoots may be literally covered with them. During the summer, winged forms are produced, which migrate to other plants; the mealy plum aphis migrating to certain grasses, and the thistle aphis to thistles. On these secondary or alternate host plants, the aphis feed and breed until fall, at which time winged forms are produced which return to the plum, where they give birth to the females which lay the winter eggs.

Control: As soon as the aphids are in evidence on the leaves, the trees should be sprayed thoroughly with nicotine sulphate in combination with lime sulphur or Bordeaux mixture, 1 pt. to 100 gallons of spray. If the nicotine sulphate is used alone, soap at the rate of 4 lbs. to 100 gallons should be added.

The San José Scale. (*Aspidiotus perniciosus* Comst.) The notorious San José Scale has been found in British Columbia, Ontario and Nova Scotia, but, due to unfavourable climatic conditions and also to the vigorous eradicator measures which have been pursued, it is at the present time largely, if not wholly, confined to the warmer parts of Ontario, south of a line drawn from Sarnia to Toronto. In the sections where it thrives, it has proved to be the most destruc-

tive pest with which the orchardist has to contend. It infests all kinds of orchard trees except sour cherries, and it also attacks many shade trees and shrubs.

Appearance: The full grown female, a soft, yellow sack-like insect, is covered with a nearly flat, circular, greyish scale about the size of a pin's head. The insect, however, is most readily identified in the immature stage, at which stage the scale is black, circular and has a central nipple encircled by a groove.



Mealy Plum Aphids clustering on young shoot.

scale. There are two broods, and probably a partial third brood in Ontario.

Control: San José Scale can be controlled by thoroughly spraying all parts of the trees with lime sulphur, 1.035 sp. gr. (5 gallons commercial to 35 gallons water.) The general practice in Ontario is to apply the spray shortly before the buds burst.

The Plum Curculio (Conotrachelus nenuphar Hebst.) The Plum Curculio, a native weevil of Western North America, is a very serious pest of plums, other stone fruits, apples and pears. Generally speaking, it is most troublesome in orchards situated near bush-land, waste land, and thickets, which afford the insect favourable winter quarters.

The adult curculio is a rough, hump-backed, greyish-black, snout-beetle, about $\frac{1}{2}$ of an inch in length. The larva is a small legless, whitish grub with a brown head.

Nature of Injury. The San José Scale infests all parts of the tree above ground — trunk, branches, twigs, leaves and fruit. On a badly infested tree the bark may be almost completely encrusted with the scales. The injury is caused by the innumerable insects extracting the sap, by means of their piercing sucking mouthparts. This continual drain of sap weakens and, if nothing is done, eventually kills the tree outright.

Life-history: The winter is passed on the bark in the black immature stage. In the latter part of May, the males—minute two winged flies—emerge from their scales and fertilize the females. About a month later the females commence to give birth to tiny, yellowish young, which wander around for a short time, then settle down and cover themselves with the waxy material which forms the

Nature of Injury.—The curculio injures the fruit by eating out holes in it, and by making, in the operation of egg-laying, small, characteristic crescent-shaped wounds. Fruit infested with the curculio grubs, falls prematurely and of course is worthless.



Plum Curculio egg-crescent on a cherry. .

Life-history.—The insect passes the winter in the adult stage among long grass or under leaves and rubbish in or near the orchard. The beetles emerge from their winter quarters in spring, and as soon as the fruit is set, proceed to lay their eggs. Little grubs hatch from the eggs in less than a week, and burrow into and feed upon the fruit pulp. As previously mentioned, the infested fruit drops, and the grubs, when full grown, leave the fallen fruit and enter the soil where they transform to pupæ and from pupæ to beetles. The beetles of the new generation feed on the fruit but do not lay any eggs. On the approach of cold weather they seek hibernating quarters.

Control.—Three measures are of importance in the control of this pest, viz: (1) Keeping the orchard and its surroundings as free as possible from long grass and all sorts of rubbish. (2) Cultivating the orchard frequently, and as late as can be done without interfering with the maturing of the wood. (3) Spraying with arsenate of lead, $1\frac{1}{2}$ pounds powder or

3 pounds paste to 40 gallons. The spray should be

applied when most of the calyces or "shucks" have fallen, and the application should be repeated two weeks later. The general practice is to combine the arsenical with the lime sulphur or Bordeaux mixture.

The Fruit-Tree Bark-Beetle (*Eccoptogaster rugulosus* Ratz).—Plum trees are sometimes attacked by the Fruit-tree Bark-beetle, a very small, reddish-black, hard-shelled insect about $\frac{1}{16}$ of an inch in length. The presence of this pest is indicated by numerous small holes in the trunks and branches, and by the masses of gum which exude from these holes.

The beetle breeds only in dead or dying trees and branches, but it will attack healthy trees, and may weaken them to such an extent that, in a season or two, if nothing is done, they will become suitable for breeding purposes and may be killed outright.

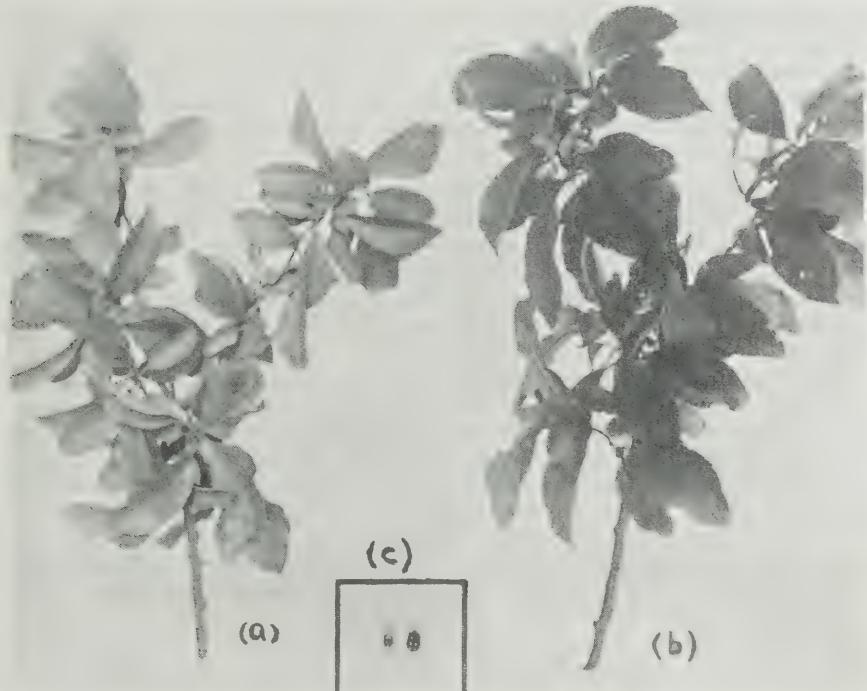
Life-history.—The winter is passed as larvæ in passages beneath the bark. In Ontario, the beetles appear in June, and burrow into dead and sickly trees. Beneath the bark they construct tunnels in which the eggs are deposited. The little white grubs which emerge from the eggs burrow in and feed upon the wood. In due course they transform to pupæ and then to beetles. The second generation beetles commence to emerge from the trees about mid-August.

Control.—The most important step in the control of this insect is the elimination of breeding places. All dead and dying fruit trees and branches and all trees in too poor condition to be of commercial value, should be removed before they become centres of infestation. Such trees and trimmings may be burned in the stove during the winter, but all must be destroyed before June. Trees slightly injured by the beetles may be saved by rather severe pruning, thorough cultivation and the applications of some quick acting fertilizer. A coating of thick whitewash applied before the beetles appear in June, and, if necessary, again about the first of August, is of value in warding off the attacks of the beetles. The addition of $\frac{1}{4}$ pound salt to every pail of wash will add to its sticking qualities.

The Peach Twig Borer (Amarsia lincatella Zell).—This insect is the most important insect pest of the plum and prune in the irrigated sections of British Columbia. It has occasioned a loss of 50 per cent in some orchards in certain years. Peaches, apricots and cherries are also attacked.

Life-history and habits.—The adult of this insect is a minute moth which may be found on the wing in the orchards during May and June, and again in August and September. In a normal year two generations occur. The greatest injury is caused by the larvæ of the second generation at the time the fruit is ripe on the trees. Here the tunnelling in the fruit and the unsightly castings materially interfere with the marketable qualities of the fruit. No control is feasible at this time of year unless the infested fruit be collected and destroyed. The last brood of moths lay eggs which develop into larvæ in the autumn months. These larvæ form burrows in the crotches of the tree, in which they remain all winter. In the spring these larvæ emerge and burrow into the growing twigs and young fruit. A certain amount of superficial feeding also takes place on the shoots and foliage.

Control.—An application of lime sulphur solution, dormant strength, 1-9, applied just previous to the blossoming period has given excellent control. Arsenate of lead at the rate of 2 pounds to the 40 gallons of the mixture may be incorporated in this application, or a separate application of the arsenical, with



(a) Showing pallid, sickly appearance of mite-injured plum foliage.

(b) Normal plum foliage (reduced).

(c) Plum Spider Mite—Male and female.

or without the fungicide may be applied immediately after blossoming. In a severe infestation the two applications are desirable; in a slight infestation one or the other may be selected but preferably the application before blossoming.

The Pear Thrips, (Taeniothrips inconsequens Uzel).—In Canada, the pear thrips occur in injurious numbers in the southern sections of Vancouver Island,

B.C., where it causes much loss to prunes, plums, cherries and other orchard fruits. It also occurs at one or two points in the Niagara Peninsula, Ont., but thus far, not in sufficient numbers to cause any loss.

Life-history and habits.—The insects pass the winter in the soil beneath the trees, the adult thrips emerging in the early spring practically conjointly with the bursting of the buds. The adults, which are about 1 mm. in length and slender in proportion, enter and feed upon the buds even before they have opened. It is the feeding habits of the adults upon the buds and delicate floral parts that cause the important damage to plums and prunes which are more tardy in bud development than apples and pears and suffer greater proportional damage. Eggs are laid in the petioles and midribs of the leaves, in the floral parts, and on the stems of the fruit. The oviposition habits naturally cause some injury but it is secondary to the feeding habits of the adults which cause "blasting" of the buds and the failure of the fruit crop. Larvae occur inside the calyx cup, on the leaves and fruit, feeding on the nectar, and plant juices.

Control.—The adult insect must be recognized as it is essential that its appearance on the buds be observed. This usually takes place as the bud scales are loosening. Applications of spray should commence within a week as it has been conclusively shown that the spraying against the adult thrips, as they are entering the buds, is more important than against the larvae, and if properly accomplished, particularly in a light infestation, a single application will suffice for the season. In a severe infestation, three applications of spray may be necessary, two before blossoming and one after. The most satisfactory spray mixture to use is nicotine sulphate 40 per cent, $\frac{3}{4}$ pint to 100 gallons (U.S.) of water, with $\frac{4}{5}$ lbs. of dissolved soap added, applied under pressure of 200 lbs. well directed at the buds.

The Plum Spider Mite, (Paratetranychus pilosus, Can & Franz).—The Plum Spider Mite, or European Red Mite, has a wide distribution in Canada. It has been found in Nova Scotia, New Brunswick and Ontario in the east, and in British Columbia in the west. The mite is a minute, reddish, oval-shaped, eight-legged creature. It breeds on apple, cherry and some other plants, but, in the Niagara fruit belt at least, the European plum is undoubtedly its favourite host plant.

Nature of Injury.—In the Niagara district the mite is one of the major pests of the plum orchard. It attacks both surfaces of the leaves, and, by means of its mouthparts, punctures the tissues and withdraws the plant juices. At first this results in a speckling of the leaves, and later on, if the infestation is severe, all the leaves become pallid, sickly in appearance, tough, and largely functionless. From a distance the foliage on badly attacked plum trees looks as if it were coated with road dust. The injury to the leaves robs the trees of vigour, checks the growth of the wood, dwarfs the fruit and retards its ripening. Investigations have shown that a severe mite infestation may cause a 20 per cent to 40 per cent reduction in the size of the fruit.

Life-history.—The winter is passed in the egg stage. The eggs are located on the bark anywhere from the tips of the twigs to the trunk, usually on rough bark and in the axils of shoots and spurs. The eggs commence to hatch at the time European plums are in bloom, and the newly hatched nymphs migrate to the leaves and proceed to feed upon them. They become mature in about $2\frac{1}{2}$ weeks, and the females, after mating, lay their eggs on the leaves. The first generation is succeeded by five other generations in the Niagara district.

Control.—The plum spider mite can be readily controlled by thoroughly spraying the trees with lime sulphur (1 gallon commercial to 40 gallons water) at the times recommended for the control of Plum Curculio, Brown Rot, etc., viz: (1) when the fruit is set and most of the calyces have dropped and (2) two weeks later.

